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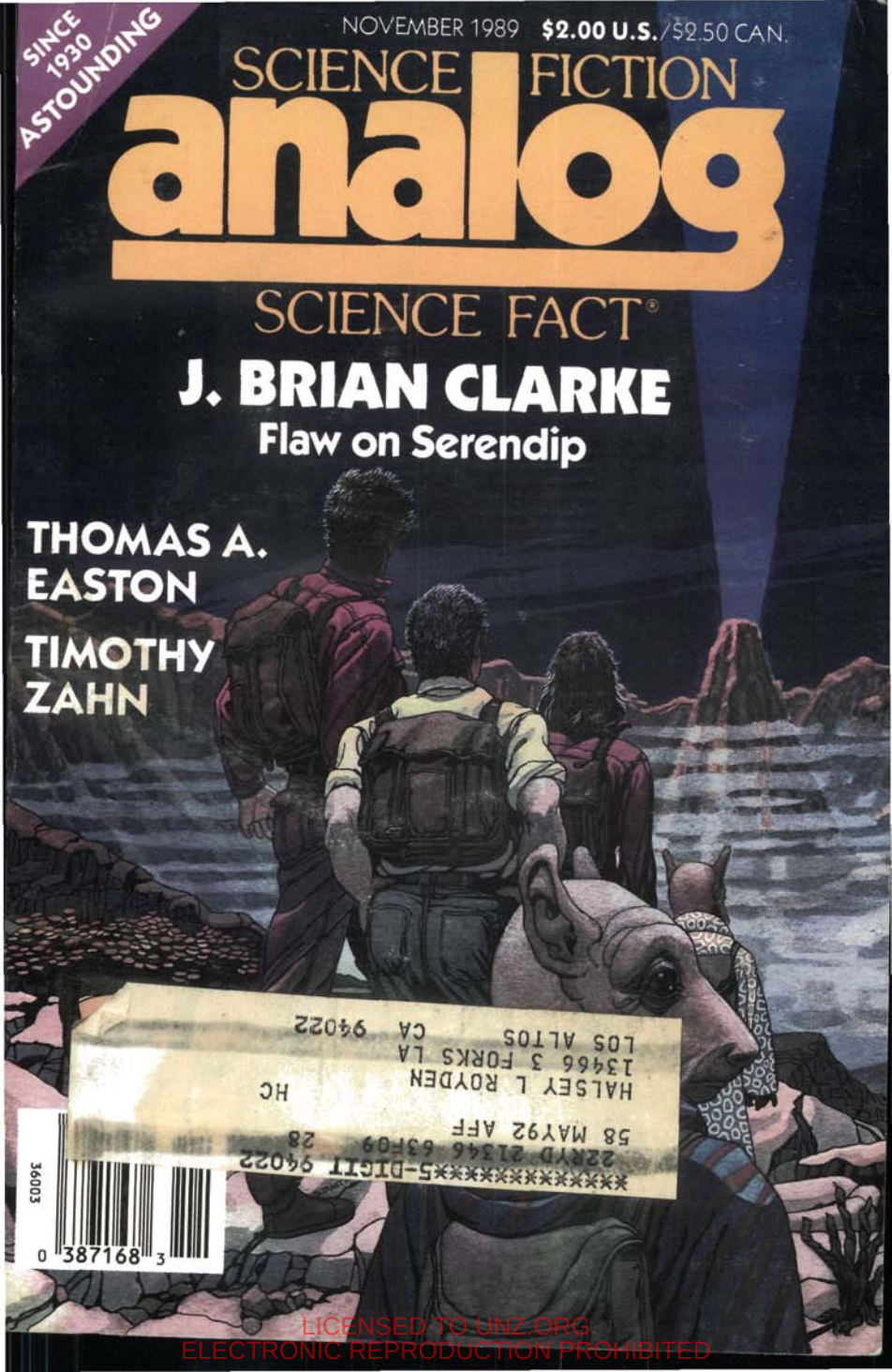

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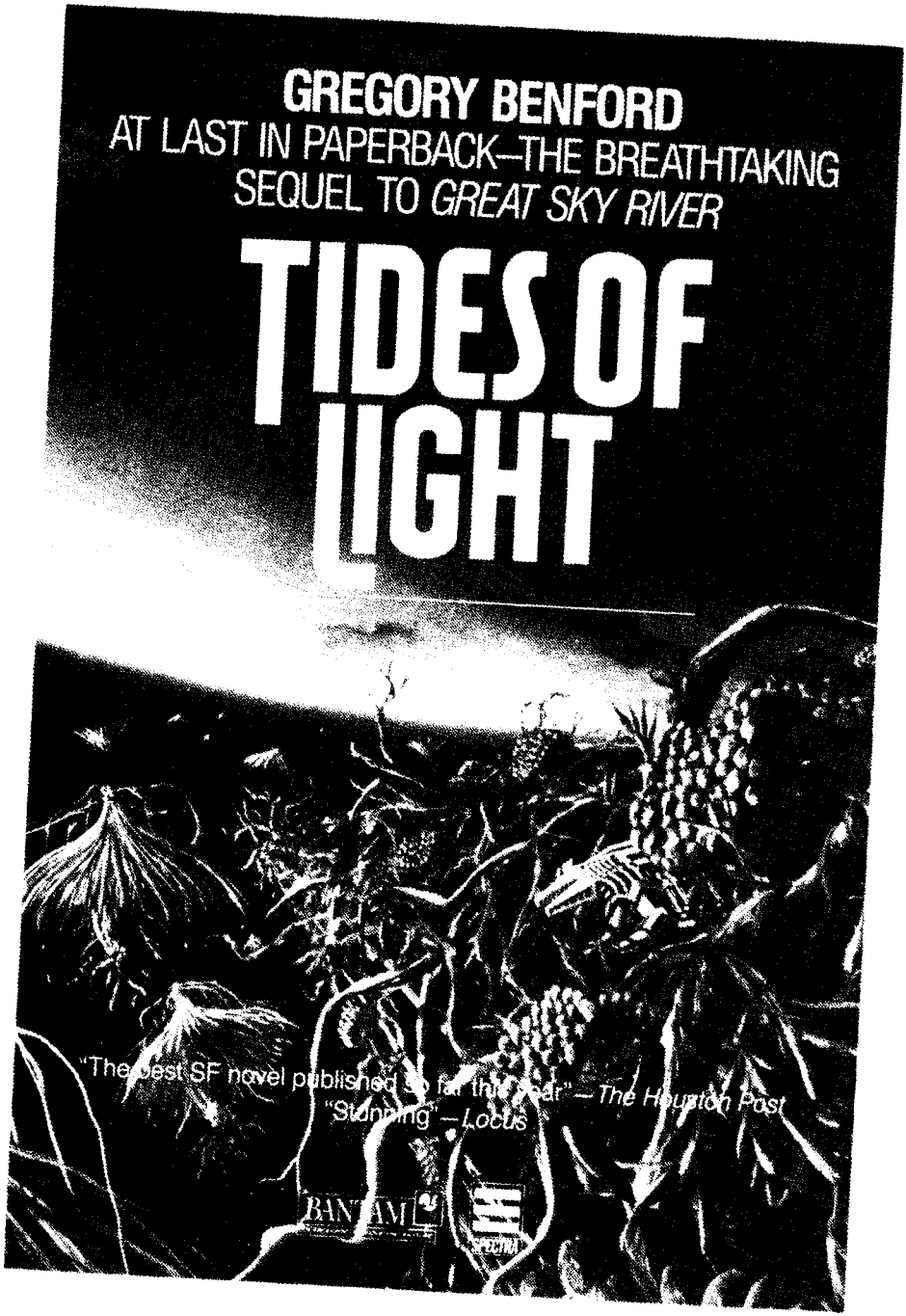
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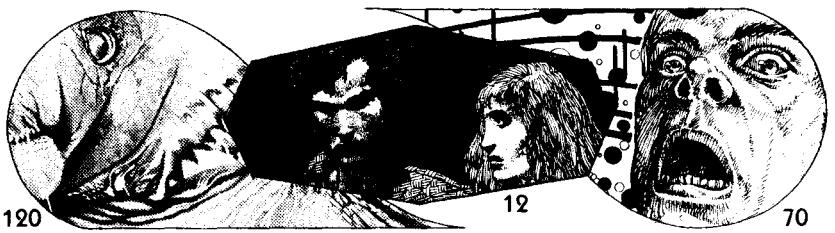

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Editorial

TOWN MEETING

Stanley Schmidt

During one of my recent wanderings, I had occasion to visit a town meeting where a small city was grappling with one of those technology-environment-and-society issues that surround us all. Watching the proceedings was a most instructive way to spend an evening. It was a good reminder of the complexity such issues commonly display, as well as the human tendencies that further complicate attempts to deal with them. It just may have also suggested a useful principle for any community to keep in mind in dealing with such problems in the future.

The issue at hand concerned a factory which wanted to expand its operations by building a new plant adjacent to one it had already been operating for some years. Through a series of historical quirks, the site of the present plant and the proposed addition was, to the eyes of an outsider and many insiders, rather peculiarly situated. Rather than being surrounded by other factories, it was surrounded by a protected green belt and a residential area. The company argued that it had already been allowed to do what it was doing and the expansion was just more of the same, that its environmental impact would still be within federal and state limits even after expansion, and that expansion would create new jobs. Residents, especially those in the neighborhood near the factory, feared its ecological impact on the adjacent

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river, and the expected increase in noise and several kinds of air pollution. Both noise and air pollution were *already* unacceptable, according to those who had been living with them for years. Even the company conceded that both would increase, though it maintained that the increases would not be significant.

Not surprisingly, such arguments evoked some responses that were more emotional than reasoned, such as, "Where our children are concerned, *no* risk is acceptable!" That's a nice slogan, but has little applicability to the Universe we live in. We may choose not to consider any risk acceptable, but in reality we have to live with some risk whether we like it or not. The real questions are how much risk we can accept under what conditions, and how much we can afford to eliminate. That's where the complexity comes in—and, to give credit to all concerned in the meeting I sat in on, that's where most of the serious discussion was focused.

But it wasn't simple. If one unequivocal conclusion could be drawn from listening to all the people who spoke, it's that issues like this are seldom, if ever, simple. Those who have to make decisions about them are not in an enviable position. And if the intrinsic complications aren't enough, the ways people deal with them introduce complications of their own.

Not surprisingly, both proponents and opponents of the plant's expansion tended to emphasize figures that seemed to support their position, playing them for maximum emotional impact, while seeking unobtrusively to divert attention from any that might weaken it. Even though I came into the controversy cold and had missed one earlier meeting on it, it quickly became apparent that the most crucial issue was a particular air pollutant at least suspected of contributing to various respiratory diseases. The key questions were (1) what concentrations of this pollutant have what medical consequences, and (2) how much of this pollutant would be released by the factory, presently and after the proposed changes. Most of the speakers I heard directly were opponents, who quoted lots of scary numbers for point (1), medical consequences. It was a long time before they even mentioned point (2), amount of pollutant. When they did, the amounts they quoted were for total quantity of pollutant discharged. Proponents, according to testimony quoted from records of the earlier meeting, stressed numbers for point (2) as being "within allowed standards," while saying remarkably little about point (1).

Neither side, until quite late in the proceedings, made any attempt to translate concentrations-at-recipient (which determine medical significance) into amounts-released-by-factory (which determine the environmental condition whose significance is to be evaluated). It didn't seem to occur to anybody that until those two sets of numbers were translated into terms that could be compared directly, *neither of them meant anything at all*. If you know that a concentration *A* of substance *B* produces a certain medical hazard, this does *not* automatically mean that any factory dis-

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charging substance *B* poses that hazard. Before you can determine whether it does, you *must* determine not only how much of substance *B* the factory releases in a given time, but what happens to the substance *after* it is released. If its subsequent behavior leads to a concentration *at people's noses* in excess of the critical level *A*, you have the hazard. If it doesn't, you don't.

"Subsequent behavior" turns out to be a complicated matter, if only because it involves transport of material by that extremely complicated system called the atmosphere. Furthermore, real medical hazards are not simple yes-no, on-off propositions like the hypothetical example in the preceding paragraph. They tend to be statistical. *Some* of the people exposed to a chemical get sick; some don't. If the concentration increases, so does the number of people affected—but it's very hard to tell exactly how much. Often some of that

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chemical is present naturally. When you try to establish a connection between it and medical effects, it's hard to separate the effect of the substance you're studying from that of myriad others (some of which may also act synergistically). The effects of new exposure can depend in various ways on the patient's past history.

And so on.

Thus, in the example at hand, the figures quoted for the medical significance of the major pollutant—e.g., whether it was a sure cause of cancer, a possible contributor to it, or no factor at all — varied widely. They were based on studies by several different groups who had not all done their research the same way or obtained identical results. Most were based entirely on (nonhuman) animal studies, and there was little or no data "of epidemiological significance" available for humans. Reason: such studies would require following the medical history of large numbers of real human subjects over many years.

This is a central problem in most environmental controversies: how do you make a decision when the data you have on which to base it are incomplete, inconsistent, and inconclusive? "Don't decide until they *are* complete, consistent, and conclusive" is not an option. If you decide to do nothing, that is a decision and an action. On issues of this complexity, the chances are very good that the data will *never* be complete, consistent, and conclusive. Experimental uncertainties and confusing side effects we shall always have with us.

So decisions must be made, and they must be made on the basis of information which is not complete or perfect. And real people must live with the consequences.

But they can, at least, learn from their experience.

Part of what they can learn is available immediately. I would hope that all who watched the decision-making process itself would come away with a better appreciation of the simple fact of complexity. I would hope that they would view such issues in the future with a heightened awareness that they are seldom, if ever, as simple and clear-cut as the most vocal advocates of either side make them sound. And I would hope they might bear in mind, when arguing such cases in the future, that since the issues are *not* simple and clear-cut, it's vitally important that both sides play fairly with such data as they have. The data may not be perfect, but for anybody who really cares about getting the best possible decision, it's essential that all available data be used as accurately and carefully as possible. Playing games, presenting data in a lopsided way, and going for emotions at the expense of reason may help one side or the other win—in the short term. In the long run, such tactics merely inspire distrust of the whole process and everybody involved in it—and everybody loses.

But the lessons to be learned go far beyond parliamentary ethics. They go right down to that imperfect body of information on which decisions must be based—which can and should get better.

One of the speakers I found most in-

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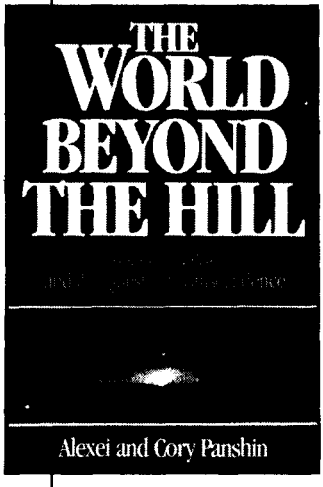
teresting was an opponent of that factory's expansion who concluded his remarks to the council with words like these: "If you do approve this expansion, despite all the dangers we've pointed out, some good may yet come of it. We'll have a chance to *get* that long-term data of epidemiological significance, because you'll have lots of guinea pigs: the people of this town."

His speech was heavy with irony, and clearly intended to sway the council to rule against expansion. But he had a good idea there—one that the council would do well to keep in mind, no matter what is decided.

There are few phrases more calculated to raise public hackles than "people as guinea pigs." Yet the only real, definitive way to learn how people react to things is to try the experiment and pay close attention to the results. "Experiment on people" is popularly viewed as a definite no-no, but all of us do it every time we do anything that affects people. If we're doing the experiments anyway, the least we can do is learn what we can from them.

The council I watched, like many others faced with similar problems, was surely going to make a decision. All those councils will make their decisions on the basis of incomplete, imperfect knowledge. They will then have, in ef-



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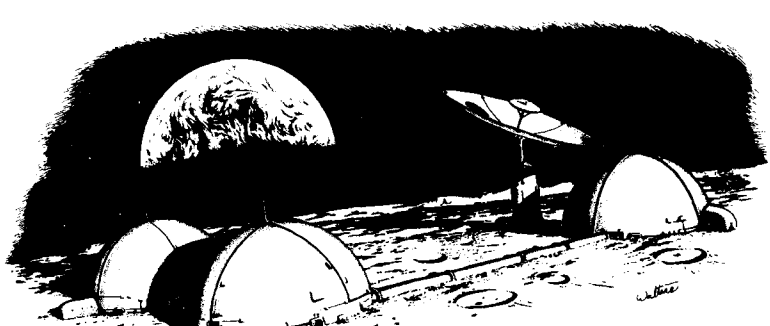
fect, whole towns of human experimental subjects who *will* be exposed to whatever conditions they chose to approve in the decades to come. Subsequent experience will subsequently show that some councils made the right decisions and others did not.

But the only way they'll *know* is by monitoring the results. If a key issue is the effect a factory's expansion might have on its neighbors' respiratory health, their health should be monitored in the years following the decision. This should be done, if possible, *whichever way the decision went,* and the results compared with data for other towns which faced similar problems. Then, when similar decisions must be made twenty or thirty years hence, there should be a much solider basis for making them.

I propose as a general principle that all such cases, or as many as practical, *should* be treated as experiments—and that the follow-up studies should be made a condition for granting requests such as that of the factory that wanted to expand. Who should do such studies? Not the company itself, for obvious reasons—and not an environmental group that campaigned against it, for the same obvious reasons. Outside labs could be hired to do the work in such a way that they have no vested interest in the findings. Exactly who should fund them, and on what terms? That's an important question, and probably not a whole lot simpler than the environmental questions themselves.

But it's an area that needs to be explored. Those environmental questions will continue to arise, and decisions will continue to be made about them. There's no reason why the results of past decisions should not be actively contributing to a better data base for future ones. ■



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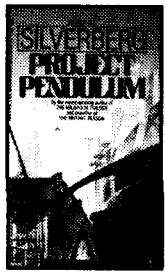

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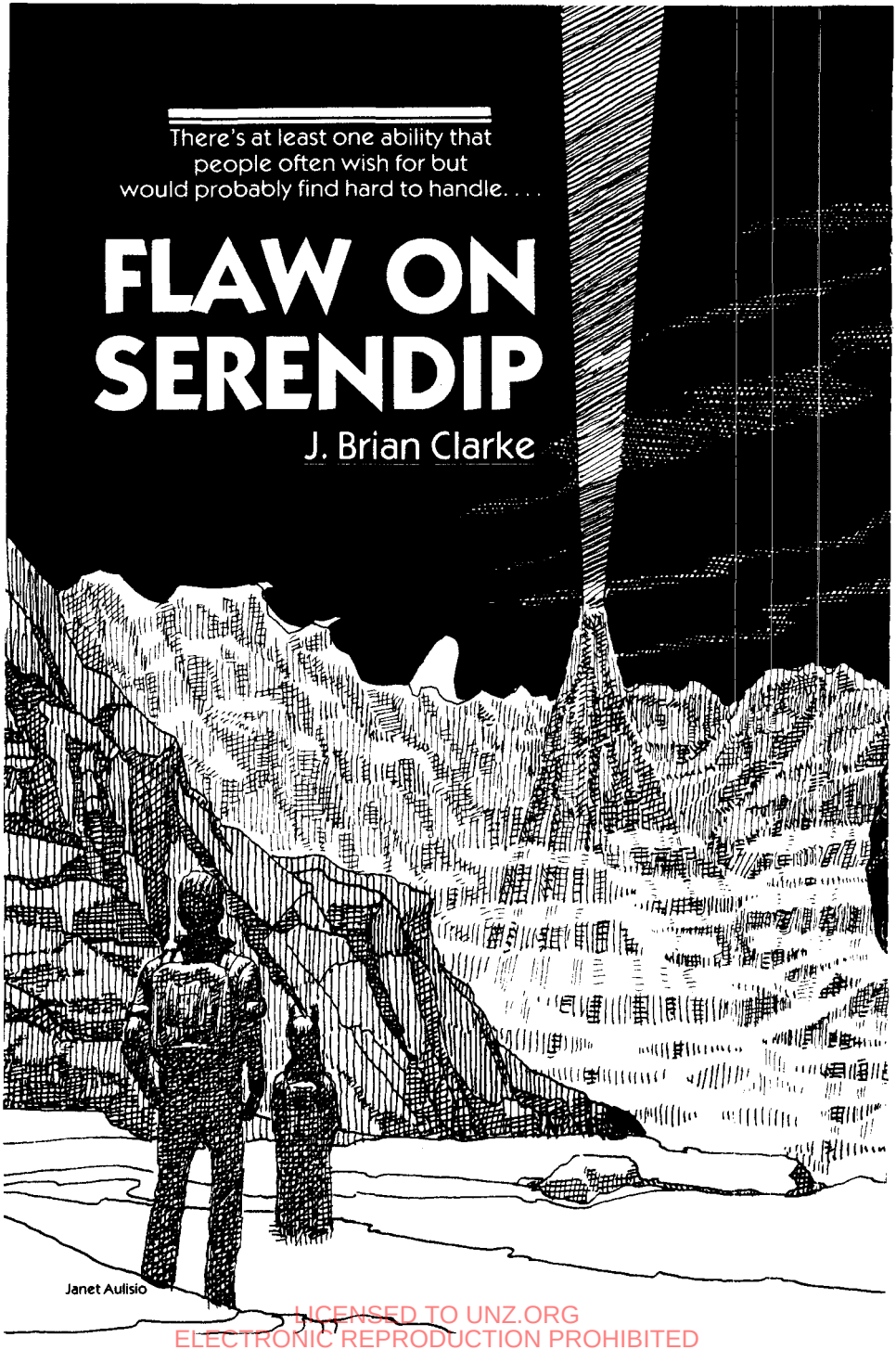
FLAW ON SERENDIP

J. Brian Clarke



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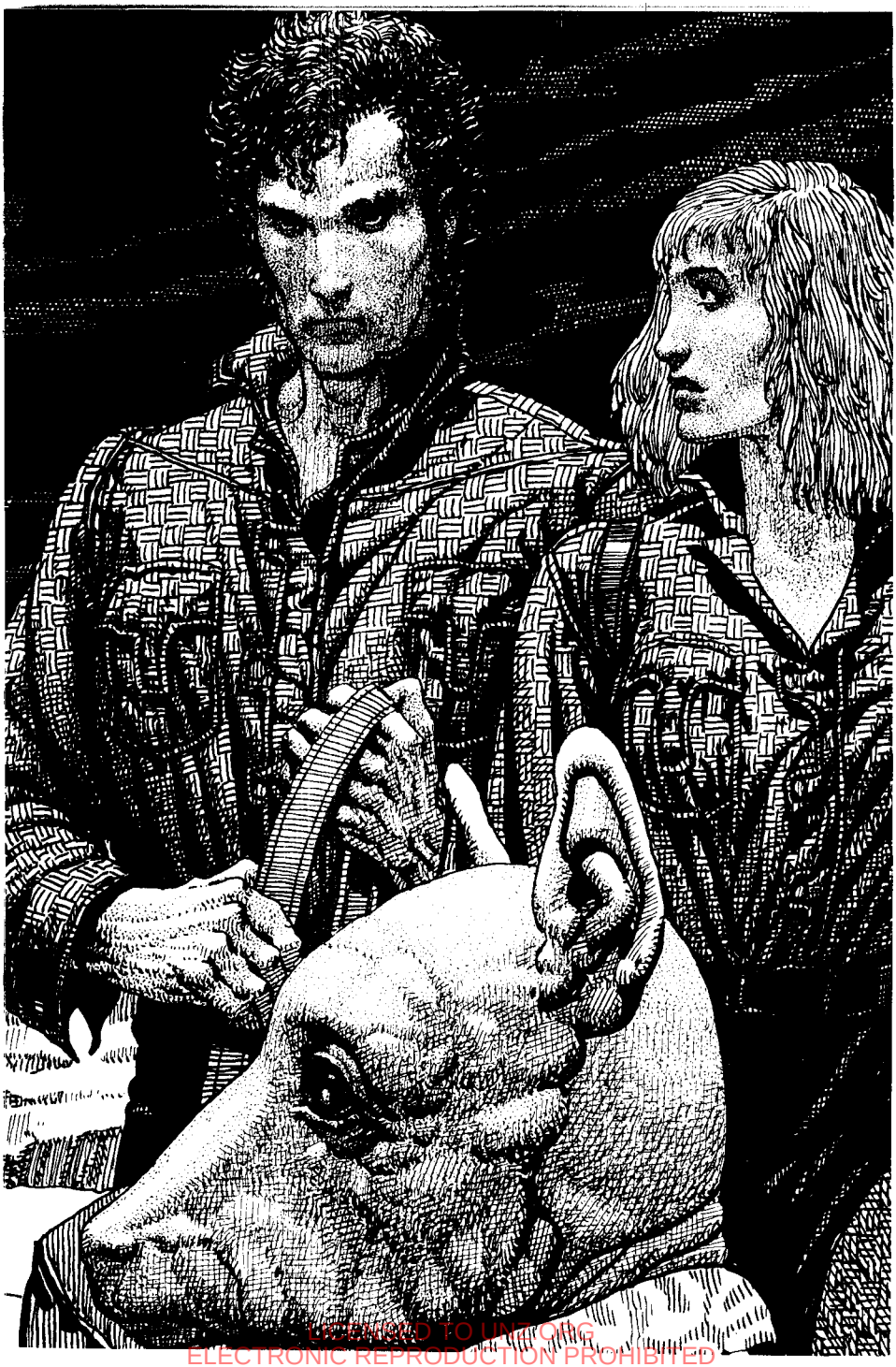

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Although by the standards of lesser beings the builders were immortal, yet they were not gods. They were therefore not omnipotent. It was even conceivable that they could make a mistake.

When they came to the realization that a leak was a theoretical possibility, it was too late. After eons of commitment, a minor hyper-dimensional flaw was an irritant which could not be allowed to stop that which was nearly complete. If intelligence was to be the lifeblood of the future galactic organism, that blood had to circulate.

The network was built to last. Although the builders eventually evolved beyond the constraints of the physical universe, that mightiest of their works endured—waiting for those who in some distant future would be its users. Stars were born and stars died. Other stars destroyed themselves in cataclysmic explosions which enriched the continuum with their transformed matter. Thus the galaxy evolved toward its own maturity. Life appeared on many young worlds, and in the few rare instances where it crossed the line from instinct to self-awareness, it faced the inevitable question: "Who am I?" Even rarer were those who asked, "Are there others?" Rarest of all were the instances in which grasp caught up with reach and life journeyed to worlds other than its own. Only then was the network finally triggered to its true purpose.

It was then, at the exact nanosecond of activation, that what the builders feared might happen—happened.

The resultant zone of discontinuance was tiny and slightly displaced from one of the gates. It was also located in difficult terrain. So it would probably have remained hidden from those who had learned to use the network, if it was not for an elderly eccentric and his need to wander—

Banff, the single human community on the world known as Serendipity, had been named by a homesick surveyor who recognized the similarity of the local topography to that of his favorite resort town amid the Rocky Mountains of distant Earth. Although Jason Kurber had arrived here only hours before, the bucolic combination of log-constructed buildings and soaring mountains had already relaxed the somewhat jaded expediter to the extent he was not even slightly irritated when Jameson DeGrasse approached him in Banff's main lodge.

Kurber greeted the other with a broad grin of recognition. "Jim you old reprobate, when I heard you were here I had to pinch myself to believe it. How can you stand a year of running this placid picture-book?"

DeGrasse, a stocky graying man with an affectation for clashing colors, was uncharacteristically somber as he shook Kurber's hand and sat down. He gestured at the food tray. "Don't let me stop you, Jase. It may be a long day."

Kurber's fork hovered half way to his mouth, then lowered. "Please. I am here on vacation."

"I know," DeGrasse said regretfully. He spread his hands wide. "Unfortunately, I have no choice. I would not be bothering you if there were anyone else."

Kurber sighed. "So what is the problem?"

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"It's about our only permanent resident."

"Cal Bremmer?"

"I understand he's a good friend of yours."

The expediter nodded. "True. I have known Cal since he was appointed custodian here about twelve years ago."

"When did you last see him?"

"Two years ago, when the wife and I stayed in his bungalow for a few weeks. As a matter of fact, I was hoping to see Cal when I arrived yesterday. That was when I was told he was away on one of his hiking trips."

"He's back."

Something in the administrator's manner made Kurber uneasy. "Is Cal OK?"

DeGrasse shook his head. " 'Fraid not. Jase, I want you to come with me to the clinic."

Kurber pushed his chair back from the table. "I think," he said grimly, "I have just lost my appetite."

He accompanied DeGrasse out of the lodge into the bright sunshine. Serendipity was a glowing world of clean skies, a mild climate, and vegetation of reds, golds, and browns which made homesick humans think of that season which in Earth's north temperate zone marks the glorious death of summer. Visible above and beyond Banff's small cluster of buildings, at the head of a valley between snow-dusted peaks, a flickering sphere of light glimmered palely over a huge horizontal bowl and its towering three-thousand meter support column. A shuttle thundered aloft from the strip which separated Banff from the Phuili settlement of Freghevquul, spiraled for altitude, and then banked directly into the light. The roar of its jets ceased as if turned off by a switch, and even as the fading echoes still rumbled among the peaks, Kurber knew the shuttle was already descending through the thin air of another world far around the curve of the spiral arm. In this age, the time required to travel between stars—even across the width of the galaxy—had been reduced to less than a heartbeat.

The clinic was located at the far end of what was euphemistically sign-posted as "Main Street." Because of the strict limits imposed on those who—after intensive screening—were allowed to experience the natural delights of this rare and lovely world, the small staff of one doctor and two paramedics was rarely overworked. Nevertheless the harried expression on the middle-aged face of the doctor as she met DeGrasse and Kurber, was that of a woman who dearly wished she were elsewhere.

"Although I have read about this kind of thing in the literature," she told the visitors as she ushered them into a windowless room illuminated only by a dull-glowing fluoropanel, "this is the first time I have had a patient who suffers from it. Frankly gentlemen, the best I can do for Cal Bremmer is to have him loaded aboard an Earth-bound shuttle A.S.A.P."

The man in the bed was well built despite his seventy-three years. His face was strong, with the weathered look of a lifetime spent in the open air. Yet the pain and confusion expressed in the staring eyes and twitching cheeks, were something Kurber doubted he would ever forget. "What in god's name—"

Bremmer squeezed his eyes shut and

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turned his face away. "Don't do that," he mumbled into the pillow. "It hurts."

"Watch," The doctor flicked the switch beside the door. As the main room light turned on and then off again, the old man lifted a hand to cover his exposed ear. "Let me sleep. Please."

They went back into the corridor. Still shocked, Kurber asked, "Does 'it' have a name?"

The doctor nodded. "Synesthesia. It's a syndrome in which the brain misinterprets incoming signals. Sound, Cal sees. Light, he hears. Notice how he covered his ear when I flicked the light switch? How he turned his eyes away when you spoke loudly?" She shook her head. "The poor man still has not realized he has to close his eyes to quieten what he thinks is noise, or cover his ears against what his brain tells him are intolerable flashes of light."

"How did he get that way?"

"Good question, Mr Kurber, and I wish I knew the answer. I suppose you already know that Cal spent most of his free time exploring the local scenery on foot. Yesterday he took a jeep to a spot about fifty kilometers southwest of here. He radioed his location and said he was going to hike that area for a couple of days. That is the last anyone heard from him until shortly before midnight, when he was found staggering around at the west end of Main Street."

"You just told us he is as good as blind! So how did he manage to drive—?"

"He didn't. The jeep was where Cal had left it—with his communicator left behind on the seat. I should add, by the way, that even for a healthy man with full vision, the location is a strenuous fourteen hours daylight walk from here."

"So obviously someone brought him back in another vehicle."

The doctor shook her head. "Everyone, including visitors and staff, has been accounted for. So has all ground transport; floaters as well as wheeled. And of our two heliflyers, one is in for routine maintenance and the other is a thousand kilometers from here. In any case, why would that nice and obviously sick old man be left to fend for himself in the middle of the night?"

"What about the Phuili?"

DeGrasse snorted. "The dog-faces don't know anything. They wouldn't be interested anyway."

Kurber winced. "Do you agree?" he asked the doctor.

She shrugged. "I checked with the Phuili, of course. I got the impression they are as puzzled as we are."

"I bet," Degrasse said skeptically.

Kurber walked away a few steps. Then he turned. "Dammit, I do not like this at all."

The doctor smiled wearily. "Who does?"

"Have you tried to communicate with Cal?"

She shrugged. "Frequently. But even if he understood me, which I doubt, he has apparently decided to say nothing about what happened."

"If he knew the Morse code—"

"What?"

"It's a system of dots-and-dashes which was invented during the early days of wire-telegraphy."

"Do you know it, Jase?" DeGrasse asked curiously.

"Only the signal for distress."

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"So what is the point?"

"I don't know. But let's try it anyway." Despite the doctor's protests, Kurber went back in the sickroom and flicked a careful S.O.S. with the light switch. Then he approached Cal Bremmer's bedside.

After uncovering his ears, the old man whispered, "Is that you, Doc? Mr. DeGrasse? Klipis?" His body shook with silent, mirthless laughter. "I don't know what you were trying to say, but if it's to get me to talk it won't do any good. What the forbidden fruit did to me, is not going to happen to anyone else."

"Forbidden fruit?" DeGrasse whispered. "What is he talking about?"

"I wish I had never found that cursed place." Bremmer shook his head from side to side on the pillow. "Never," he repeated as tears ran down his seamed cheeks. "Never."

They went back outside the room. "He means it, you know," the doctor said. "He will not talk."

"There are drugs—"

She shook her head. "Not in his condition. As far as I am concerned, it would be a complete violation of medical ethics to allow that kind of nonsense."

Frustrated, Kurber turned to DeGrasse. "What cursed place? And how in all that's holy did he transport himself fifty klicks without eyes or transport?"

The other shrugged. "As of this moment, you know as much as I do. What else is there to say?"

Kurber lost his temper. "Only that we seem to be discussing what in any language is a bloody miracle! You don't need an expediter to solve this one. You need a witch doctor!"

DeGrasse grinned sympathetically. "Sorry, Jase. As I told you, I would not have dragged you into this if there was anyone else within shouting distance. But because you *are* an expediter, as well as Cal's friend—"

"—and being in the right place at the wrong time," Kurber grumbled as he tried to imagine the world reduced to a mad cacophony of unrecognizable signals. It had to be especially terrible for someone as sensitive to his environment as Cal Bremmer—who was, in fact, as rare a man as Serendipity itself was a special place. Although the planet was only one of nearly twenty thousand destinations which were accessible via the mysterious alien artifacts or "AAs" which linked the galaxy in a web of no-time travel, a monument in the valley below Serendipity's AA marked the spot where a two-place wingship (Phuili-piloted with a human passenger) had crunched to an ungainly landing after completing the first world-to-world traverse of the modern era. So by agreement between the Earth and Phuili governments, Serendipity was declared a natural reserve available only for strictly limited recreational use. The agreement allowed for two permanent residents, one Phuili and one human, who were custodians for their respective physical facilities, and who were also the unofficial "house parents" for those who, for any of innumerable reasons, desperately needed rest and recuperation. Cal Bremmer had been one of more than seventy thousand applicants for the job he now held, and the retired school teacher, home-spun philosopher, and

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amateur naturalist had won the appointment for reasons which that modest man would be the last to understand.

Cal Bremmer did not deserve what had happened to him.

Kurber tried another tack. "Doctor, this—ah—synes—"

"Synesthesia."

"Yes. Is it curable?"

"I believe so. With time and proper treatment."

Kurber took a deep breath and expelled it. "Thank you for that, anyway." To DeGrasse: "Jim, you are the administrator here. So I suggest you make my status official by putting in a request for my services. Also while you are at it, I will need to talk to my wife Gia Mayland. She's on temporary assignment at Expediters Central."

DeGrasse grinned. "I feel better already."

"By the way, Cal mentioned someone named Klipis. Who is he?"

"Not he. She. Klipis is the other Serendip permanent. You know, Cal's opposite number."

The shuttle arrived six hours later. The only incoming passenger was a slender woman with wide-eyed, almost elfin features. Before she entered the small terminal building, the woman stopped to lean over and brush her lips across the forehead of the man who was waiting to be carried aboard. Gia Mayland then entered the building and accepted the embrace of her husband. After they kissed, she leaned back in his arms and studied him anxiously. "Are you all right, dear?"

Kurber forced a smile. "As well as can be expected, I suppose."

She touched a sympathetic hand to his face. "Poor Jase. Cal doesn't look good at all, does he? But before I left New York, I talked to the specialist who will be in charge of the case. He assured me Cal will be back at his post within six months. Nine at the most."

"How can he say that before he sees the patient?"

"Because Cal was not born with synesthesia, it has to have been caused by some kind of intense psychological trauma. In such cases, the prognosis is usually pretty good even without treatment. With treatment, it takes a lot less time."

"Time is something Cal has not got a lot of. He is over seventy, you know."

"Don't worry." She kissed his cheek. "The Extraterrestrial Office has already budgeted for the best care money can buy."

"Yeah," Kurber said moodily. His wife's arm tucked comfortably within his, they began to walk toward the lodge. Gia took a deep breath of the crisp air and gazed with pleasure at the breathtaking scenery. "Remember the last time we were here?"

"I do. I also recollect that vacation was similarly cut short."

"But it was fun while it lasted, wasn't it?" Then Gia became serious. "What have you found out?"

"Not a lot. I have had a look at Cal's jeep and checked the odometer. The reading confirms that it had remained where he parked it. But Cal did not walk those fifty klicks, either. An Olympic athlete could not have done it—in twice the time!"

She bit her lip. "Sort of unreal, isn't it?"

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"Unreal? The term I used was 'bloody miracle'!"

"Yeah," Gia echoed mischievously. Despite himself, Kurber laughed.

Five made up the party. The Kurbers, Jameson DeGrasse and two Phuili. Klipaphrottunisrenipaziz (Klipis) was an elderly female whose sad-eyed canine features kept somehow juxtaposing with Gia's memory of her grandmother, the loving lady who had raised her after her parents died. Hreomlupfrozzipnkiaplaziz (Harry) was DeGrasse's counterpart on Serendipity; a Phuili who was known to tolerate humans only because the job required him to.

"Of all the assignments the Phuili authorities could have given that one, why did they send him to Serendip?" Gia wondered aloud as she watched DeGrasse and the two stocky aliens examine the area where Cal Bremmer's jeep had been parked. "I thought the Phuili weeded the rednecks out of their Star Service long ago."

Kurber chuckled. "I suspect Harry is an aging bureaucrat who is looking forward to the Phuili equivalent of his first pension check. Because nothing much is supposed to happen here anyway, I imagine it's an ideal posting for an individual who prefers to fade out with as little fuss as possible."

Gia sighed. "That's all we need, isn't it? A 'please do not confuse me with the facts' type, Phuili or otherwise." Suddenly her eyes widened with concern. "Jameson is not like that, is he?"

"I doubt it. Sure, I admit he is not too far from retirement, even that he has never made any secret of the fact that the Phuili are not exactly among his favorite people. But Jim's no raving xenophobe, and he has a better service record than even a lot of expediters I know." Kurber grinned. "Present company excepted, of course." He helped his wife on with her pack, then shrugged into his own. They joined the others. "Any ideas?" Kurber asked.

"Not," Harry replied. "Not only did foolish human not take communicator, he not leave information where he go fwom zis place."

DeGrasse flushed angrily. "Cal's a damn sight smarter than any—" The derogatory "dog-face" remained unvoiced as he became uncomfortably aware that Gia was watching him.

Klipis ignored the human's outburst. "He go up zere," she said, looking in the direction of a lovely valley which rose toward a perfect pyramid-shaped peak at its head.

"What makes you think so?"

"Cal always seek beauty. I see what he see."

Harry made a noise which Gia presumed was an expression of disgust. Nevertheless the Phuili administrator did not object as the group began to follow a faint trail which they found leading into the valley. After a kilometer of relatively easy going, the trail began to rise steeply between enormous trees whose broad red leaves rustled pleasantly about them. Wavering shafts of sunlight illuminated their way, while at least two species of small six-legged animals and several kinds of birds chittered and scolded the intruders.

"Marvelous," Kurber puffed as they stopped for a rest.

"What is?" Gia asked.

"This place," he replied happily.

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"It reminds me of trails I have hiked in the Canadian Rockies. You know, near the other Banff."

"Jase dear, I hate to break into your euphoria. But I do not like what is going on between Harry and Jameson."

"Neither do I," he admitted.

"Is there anything we can do?"

"Try to reason with them I suppose. Or at least with Jim." Kurber rubbed his chin. "Gia, why don't you talk to Klipis—ah—female to female? She seems a nice old soul, and I am sure she would be willing to pass the appropriate message to her less than friendly compatriot."

Gia said absently, "You know, there is something more than just 'nice' about Klipis—"

He nodded. "I know. Like Cal Bremmer."

They moved on again. For the humans it was pleasant work, although for the diminutive Phuili it did not seem to require any effort at all. Their stumpy legs covered the ground at a rate which repeatedly advanced them almost out of sight, at which point they would wait until the three humans caught up. In this irregular fashion the five climbed further up the valley, while the trees gradually became smaller and more widely spaced. Large birds, astonishingly similar to the gray jays of Earth's western North America (except for their four legs), circled overhead with frequent raucous squawks.

"Can we stop a moment?" Gia called.

They all turned and looked at her. "Human female tired?" Harry asked. "Wish longer stop?"

Gia restrained her irritation at the obvious comment on human weakness. "I am curious about this route we are following." She looked along the trail. "If there is one thing I remember about Serendipity, it is that the largest land animals are about the size of a small dog. Right?"

"Right," DeGrasse echoed. "So what is the point?"

"What made this trail?"

DeGrasse shrugged. "Cal did, I suppose. After all, he has been on Serendip a lot of years." He gestured at the beauty around them. "Perhaps this was his special place to get away from it all. Can you blame the man?"

Kurber rubbed his chin. "On his trips, did he usually radio his location?"

"Not always. And now that I think about it, never from here. Not during the nine months since I have been on Serendip, anyway." DeGrasse shook his head. "The closest I ever got into an argument with the old boy was when I reminded him he was supposed to let us know his whereabouts at all times. His rather testy response was to the effect that he had never had to before, so why start now?"

"Zen he foolish human," Harry said, seizing the chance to repeat his favorite bias. "Zis one say he not want people know he come here often, perhaps most times he away in mountains. He wadio fwom ozer places only for purpose to make people zink he go all over."

Gia realized that despite his obvious dislike of humans, Harry had made a valid point. "So why did Cal radio his location this time?" she asked.

"Perhaps zere weason he zink he might need help," Klipis suggested, her large violet eyes thoughtful. The old

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Phuili female added, "But after you find him near human place, he change mind about ozers coming here. Did he not talk about 'forbidden'? Zis one zink Cal twy tell you it too dangerwous."

"Forbidden fruit," Kurber whispered. He looked toward the head of the valley. "You know, I am beginning to feel just a little nervous. What *is* up there?"

The camped at that spot. The first hint that things were not as they should be, was when DeGrasse and then Hreomlupfrozzipnkiaplaziz tried to communicate with their respective deputies at Banff and Freghevquul. Up to a range of about a kilometer their communicators worked perfectly. (They tested, and found they could talk to each other.) Beyond that, there was silence on all frequencies. Kurber took it on himself to return two kilometers down the trail, where again he tried to raise Banff. Although the communicator's ready-light remained healthily green, it was as if the human settlement did not exist.

He returned to the camp. "So now we know why Cal left his communicator in the jeep. He already knew it would be useless!"

They spent a restless night. When the five met for breakfast the next morning, the humans ate in silence and even the Phuili seemed subdued. Finally, as they struck camp and prepared to continue, DeGrasse suggested, "One of us should scout ahead a few hundred meters while he remains in continuous radio contact." He looked toward where the ghostly outline of the pyramid peak was beginning to emerge out of the mist. "If there is something funny up there—"

Surprisingly it was Harry who was the first to agree. "Zis one not would have come if Klipaphrottunisrenipaziz not point out happening to Cal human perhaps also important to Phuili. Wadio and ozer phenomenon confirm so. Now best all be careful."

As the one who had made the suggestion, DeGrasse insisted on being the first up the trail. As he vanished around a bend, Gia drew her husband aside. She whispered, "What happened to us during the night?"

He looked at her. "I beg your pardon?"

"Jase, don't be so damned obtuse. Everyone has been acting like a zombie this morning, which means I do not need Harry's comment about 'other phenomenon' to know something strange is going on! Did we *all* have bad dreams?"

"You too, huh?"

She led the way to where the two Phuili were conversing with the incredible complexity of sounds which was their universal tongue. "Harry. Klipis. Do you mind if I ask what you are talking about?"

Large, fathomless eyes met those of the human female. "We talk about what happen in our heads while sleep," Klipis replied solemnly.

Gia said to her husband, "You see? Something is—"

She was interrupted by Degrasse's voice: *'Jase, can you hear me?'*

"Loud and clear, Jim. Everything OK?"

"So far it seems to be, although the vegetation is getting pretty weird. I can see a good vantage point a couple of hundred meters ahead. Will wait there."

They began to move up the trail. "We

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humans call it dreaming," Gia told Klipis. "Bad dreams are nightmares. Did you have nightmares?"

"Images which not organized," the old female replied. "Past, pwesent and future mixed. Places zis one not know of. Entities of types zis one not know in galaxy. Love, hate, feelings which cannot contwol. Not good."

Gia had close working relationships with many Phuili, and knew of their instinctive reliance on order; within their thoughts as well as the physical world around them. It was a pattern established over thousands of generations of slow evolution on a benign world, and even their dreams—if in human terms they could be called thus—were controlled evaluations of waking thoughts and activities. What Klipis had described was a nocturnal anarchy so totally beyond Phuili experience, it was a wonder the oldster could talk about it calmly. Gia then looked at the back of the Phuili administrator walking stolidly ahead. So what about—?

"Hreomlupfrozzipnkiaplaziz also," Klipis said, anticipating Gia's question. "Tell him perhaps best only zis one continue, while he weturn to duties at Freghevquul. He say zis one zink zhings which not be. He will not go to Freghevquul."

Gia dropped back to walk with her husband. "Although Klipis did not exactly admit to it in so many words, I am pretty sure Harry just told her to mind her own business." She frowned. "Strange. Phuili are normally excruciatingly polite to each other."

"A lot of things are strange on this trip."

"Jase, what did you dream about?"

Kurber shook his head. "Damned if I know. Everything and nothing. Things and people. Places. Met a bully who used to pick on me when I was a kid. I willed him out of existence, and he died—like fluff in a flame." Kurber swore softly. "It's a hell of a thing to realize you hate someone enough to want to do that."

Gia whispered, "I dreamed I willed my parents not to board the plane before it exploded on the runway. And I made my grandmother well again. It all seemed so real. To have that kind of power—"

"*Come in, Jase. Godammit, come in!*"

"Jim, what is it?"

"*I have been trying to raise you for the past couple of minutes! Are you people deaf down there?*"

Kurber grinned. "If you shout like that, we will be."

"*Well you're close enough so that I can see you. I am on top of the rise, ahead of you and to your left.*"

Gia waved. DeGrasse waved back and scrambled down to meet them. Conspicuously ignoring the two Phuili, he said breathlessly, "Back down the trail, we could talk when we were a klick apart. Now we're down to a couple of hundred meters!"

"So it is starting to happen." Kurber took a deep breath of air which was somehow not quite as bracing as it had been. "Whatever *it* is." He looked around him, beginning to understand DeGrasse's comment about the vegetation. Within a distance along the trail of no more than seventy or eighty meters, the trees had became transformed from graceful to stunted; their leaves from glowing reds and golds into vary-

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ing shades of sickly yellow. Further on, the vegetation thinned out to sparse ugly clumps which were separated by bare earth and patches of straggly ground growth. The pyramid-mountain at the head of the valley shimmered as if through a heat haze, although the temperature was not much above freezing.

Hreomlupfrozzipnkiaplaziz announced, "Perhaps next it zis one who go ahead."

DeGrasse grabbed Kurber's arm. "They're not to be trusted. You go. Or Gia."

Kurber shrugged his arm free with an irritable, "I don't know what is bothering you, but cut it out!" He walked up the trail to the crest where DeGrasse had been waiting. The others followed. On the far side, the ground dropped slightly before it rose again into the distance. Here the trail and the thinning band of vegetation ceased entirely, leaving undisturbed rock and dirt. Beyond, what from a few meters back had merely seemed to shimmer, was now difficult to discern. Even the pyramid had become vaguely defined, as if it was being viewed through an out-of-focus lens. Kurber squeezed his eyes shut, shook his head and then looked again. "Is it my eyesight, or—?"

DeGrasse said, "I did not say anything because I wanted you to experience it for yourself. Difficult to describe, wouldn't you say?"

"It's like no mist I have ever seen," Gia whispered.

Harry shook his snouted head. "Human female waste time saying what iss not. We need know what iss."

"We need know what iss," DeGrasse mimicked and then subsided with a surprised "Ouch!" as Gia kicked his shin. A surprised expression crossed his face. "Did I say that? Sorry."

Kurber was not sure if DeGrasse was apologizing to Gia or to the Phuili, but for the sake of harmony decided to let it slide by. In terms of obnoxiousness, it was so far fairly even between the Phuili and human administrators. He asked wearily, "Opinions, anyone?"

"Fwom here must go careful," Klipis declared. "Our minds weacting to somezing not known, especially minds of Hreomlupfrozzipnkiaplaziz and human Jim."

Gia felt an overwhelming sense of gratitude to the old Phuili, to the extent tears came to her eyes. "Just like dear grandmama. Say it right out, she always told me. Get it into the open. You will be better for—" She blinked. "What am I babbling about?"

Kurber found a convenient boulder and sat on it. He had been fighting an increasing urge to scream his frustrations at an apparently uncaring universe. Now the urge was suddenly gone and he had full control of himself. In fact, he was thinking more clearly than at any time since they started up the valley. Or is that an illusion also, he wondered? Do I only *think* I am thinking clearly?

"If I did not know better—" Kurber hesitated, frowning. Then he looked up at his wife. "If I did not know better," he repeated, "I would say that someone spiked our breakfast coffee with some pretty potent moonshine."

Gia dropped to the boulder alongside him. She stared blankly at scenery which had somehow lost its beauty. "Jase, what is going on?"

Klipis came over to the two humans.

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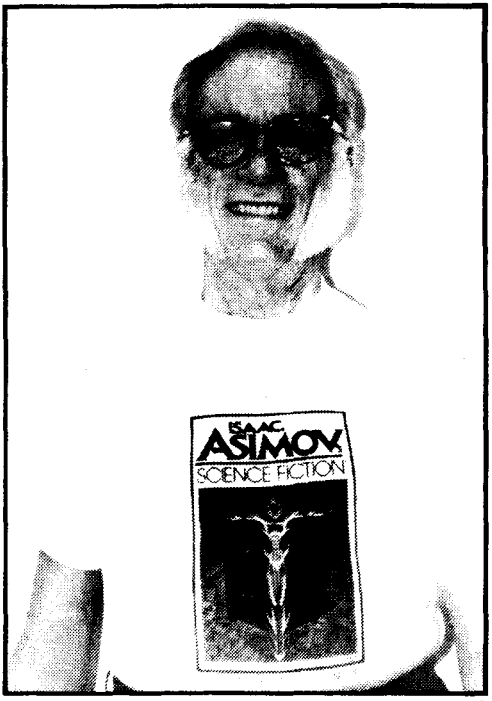

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The large gentle eyes drew them in with warmth and companionship. That the Phuili was a squat, thick-bodied, canine-headed being with physical strength which could break a human spine without effort, seemed completely irrelevant. Like her human counterpart Cal Bremmer, Klipis was a genuine good-heart and healer, with the additional advantage of her Phuili empathetic sense. She asked, "Now you identify pwoblem, you not notice effect diffewent fwom what caused by substance you call alcohol?"

"Different?" Gia echoed. She was not sure how Klipis had understood a human colloquialism which in terms of her strait-laced Phuili background should be completely alien, but somehow it did not matter. She grasped Kurber's hand. "Other than the fact I know there is not an alcoholic drink within fifty kilometers of here, how is it different?"

"Because we don't need to sleep it off to get rid of it," DeGrasse said. There was an expression of faint bewilderment on his face as he looked at Klipis, then at Harry who was standing close by. He turned back to Gia. "I understand you people talked about the dreams you had last night."

"That's right," Kurber said. He asked curiously, "What was yours?"

The other flushed. "I was commandant of a concentration camp." He licked his lips. "It was like those the Nazis had in World War II."

"And?"

"The inmates were all Phuili."

Kurber grimaced with distaste. "Oh."

"The point is, although I do not particularly like the Phuili, I have never let it affect my dealings with them. But as we came up this valley—" DeGrasse shuddered.

Gia nodded. "Dislike became hate, huh?"

"Until you gave me that kick. Now I dislike *me* even more than them. And it scares the hell out of me!"

Kurber said, "Jim, I don't want to criticize this sudden bout of self-realization, except to remind you that in the real world it takes more than a small kick to cure your kind of prejudice."

DeGrasse shrugged. "Then perhaps this is not the real world."

"Perhaps not," Hreomlupfrozzipnkiaplaziz said, who had been listening to the conversation with increasing agitation. Although it was hard to read Phuili expressions, Gia was sure she read apprehension and even fear in the snouted face of the Phuili administrator. Whatever had happened inside that inflexible mind during the previous night was, she suspected, an additional unknown factor in an equation which already had too many unknowns. The difference between human and Phuili mentality was beginning to show in DeGrasse's and Harry's reaction to what had happened in their heads; the apparent acceptance in one, the fear in the other. Yet nothing was certain; probably even less so if they proceeded further up the valley. Strange influences were at work, and if what had happened to Cal Bremmer was any indication, what they had already experienced was only the beginning.

Klipis said, "Look." The old Phuili was staring at a tiny whirlwind of dust and dead leaves which was dancing across the bare ground a few meters away. Only seconds before, the dis-

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turbance had not been there. "Say stop."

"Say what?" Kurber asked puzzledly.

Somehow Gia understood. She waited a few seconds while the whirlwind continued its erratic dance. Then: "Stop."

The whirlwind collapsed.

DeGrasse shook his head. "Coincidence," he said unconvincingly. "Gia, you did not do that."

"Damn right she didn't." Kurber's mouth was dry as hopefully he stared at his wife. "Did you?"

She smiled. "Don't worry dear, I have not turned into a monster. I only *said* stop. It was Klipis who did the stopping—and starting."

"I don't underst—"

Klipis pointed at Kurber. "You twy."

Kurber swallowed. Suddenly he was two people. One was a skeptic who would stretch coincidence to enormous lengths before he would admit the existence of anything even slightly resembling the paranormal. The other was a romantic who wanted to believe in the infinite flexibility of what the mind conceives as "reality"; a magical world in which all things are possible. Kurber then remembered his ugly dream-wish of the night before, and he shuddered. Some things should *never* be possible—

"Twy," Klipis insisted.

Despite himself, the expediter concentrated his attention on a dead leaf on the ground immediately before him. The leaf stirred slightly.

"No," he said. "No way."

Nevertheless the leaf continued to tremble. Then, as if caught by a vagrant breeze which had seized it as its only plaything, the leaf fluttered into the air. It was followed by a tiny cloud of dust which, as Kurber continued to concentrate, began to spin. Smaller leaves joined the diminutive vortex which spun faster and extended higher. More material lifted into the dancing whirlwind of debris as it spread up and outward. It had a life of its own now, like an exuberant genie released from its bottle. Above the noise of the spinning air, Kurber dimly heard his wife tell him to stop, and he made a half-hearted attempt to will the life out of what he had created. But something within him exalted in the new-found power and would not let go. He shouted angrily as a pair of hands covered his eyes. He lifted his own hands to pull them away, but was restrained by a strong grip from behind. The whirlwind sagged, began to die. Finally Kurber was released, just in time to see the last fluttering leaves drift to the ground.

DeGrasse stood back from Kurber, who dropped to his knees. Gia stayed close to her husband, kneeling with him. "My god," Kurber whispered as the power-lust drained out of him in dark, shuddering waves. At the edge of his vision, a leaf began to stir—

"No, you bloody fool!" the expediter yelled as he flung himself forward and brought DeGrasse down. The other struggled maniacally for a moment, then subsided with a strangled, "I'm sorry Jase, I didn't think! I didn't think!"

After a few seconds of confusion, the two men assisted each other as they scrambled groggily to their feet. With an understatement which would be almost comical in any other context, Klipis declared solemnly, "We have pwoblem."

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"I'm sorry," DeGrasse repeated. His eyes were glassy.

By unspoken agreement, the three humans and two Phuili turned away from the crest and returned down the trail to the place of their last stop. Something squeaked angrily at them from the underbrush, and Gia felt comforted.

His heart still thumping from the joint stimulation of exertion and wonder, Kurber shrugged off his pack and sat on a fallen log. He said tentatively, "Mind over matter."

Klipis was staring fixedly at some yellowing leaves on the ground. Horrified, Gia was about to scream a warning, when the old Phuili nodded with satisfaction. "We safe here."

"Safe?" Almost giddy with relief, the woman began to laugh. "From what?"

"Us," Harry said. The Phuili administrator gestured. "You. Klipaphrottunisrenipaziz. I. All." There was a fanatical gleam in the large eyes. "Planet not like us here. So planet give us way to destwoy ourselves."

Kurber asked, "Klipis, what did you expect when you asked me to try that?"

"Zis one not expect what happen," the old female admitted.

"So what did happen?" Gia shot back. She turned to her husband. "All right Jase, you are the one who used the term 'mind over matter.' Tell us about it."

For long seconds Kurber did not respond. *What do I say?* For any parlor trick the explanation would have been simple; mind-over-matter used facetiously to explain sleight-of-hand, or the application of simple psychology to give reality to phantoms. But this was something else; with implications so awesome it was like a crack in the universe.

Expediting had never called for this.

Kurber took a deep breath. "All right, try this on for size. Although Cal Bremmer apparently came to this valley many times, there are two reasons why he did not tell anyone where he was or what he was doing. First, he was scared. Whatever it is up here; psychic zone, force field or whatever, he figured he had stumbled on to something that most people—Phuili as well as human—are not equipped to handle. In a few dozen generations perhaps, but not now. The second reason has to do with Cal himself, his curiosity to learn more. Using the rationale that it would be OK because he was the only one at risk, I suspect he experimented; cautiously at first and then more boldly. It was probably dumb luck that nothing got away from him as it almost did with me, because if it had—without the presence of others to force restraint—god knows what would have been unleashed. A local phenomenon? A disaster on a planetary scale? Anyway, it looks as if Cal was somehow declared out of the game before too much damage was done. Which is, I suppose, where we come in. With the knowledge we now have, do we quit while we are ahead? Pretend nothing happened and hope no one else becomes too curious? Or do we continue what we started; hopefully to learn enough that we can make some kind of decision about what we *should* do?"

Klipis said softly. "What you most say, zis one agwee. Yet why not you yet talk about mind over matter?"

For the first time in his life, Kurber lost his temper in the presence of a

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Phuili. "Dammit, what are *we* risking by being here? Synesthesia? Or something worse? And what about the possibilities hinted in our dreams last night? Correction; not possibilities. Warnings!"

"Of what?" the old female alien insisted.

"Klipis, you and I used mental power merely to move a few leaves around. But what could we do after a little practice? What would we do? Where would we stop? Would we throw boulders around, perhaps? Move trees from here to there? Shift a mountain? What if we tried it on people—"

"—like Cal Bremmer tried it on himself," De Grasse muttered. He clenched his fists and held them to the sides of his head. He began to laugh hysterically. "Beam me aboard, Scottie! Beam me aboard!"

Fortunately Klipis did not query the hoary old cliché, which in any case was only partially appropriate. But all understood, and were startled by the implications. "It was Cal's last experiment," Gia whispered, "to literally think himself back home." She shuddered. "But what it did to him—"

So they stayed.

The decision to further investigate the phenomena was not difficult. That the two weakest members of the five should also remain involved, was forced by the logic of basic security. Although Hreomlupfrozzipnkiaplaziz, and then DeGrasse, promised to wait while the other three worked their way toward the heart of what had become labeled the "mystery," their obvious instability made it impossible to know whether either of them could or even intended to keep that promise. Nevertheless, DeGrasse and Harry were surprisingly reasonable when they were asked to stay with the group.

"If you want me to continue along," DeGrasse said with a shrug, "OK, I will."

The Phuili administrator had only two words, "I come."

Cautiously they worked their way up the final section of trail they had already covered twice before. At first Kurber tried to keep his mind blank, until he realized the silliness of attempting to "turn himself off." So instead he turned his thoughts toward pleasant things. The merry sound of Mozart. The pounding of surf along the California shore. His acceptance into Expediters. Erotic images of his body and soul mate—

Gia whispered into his ear, "Jason Kurber, you flatter me extremely. But really, is it appropriate while there are others around?"

Startled, he stopped and looked at her. "Did I say something?"

She twinkled at him. "Not acoustically." She touched his forehead. '*Not to worry, darling. I think it was only between us two.*' For a timeless moment they would remember for the rest of their lives, their inner selves touched, caressed and merged.

They had regained the crest. Beyond, it was as before. The descending and then rising terrain, the sense of strangeness, the distortion of vision which somehow made the scenery look *bent*.

"Now for the tough part," Kurber murmured, still marveling and still warm from the experience which he realized

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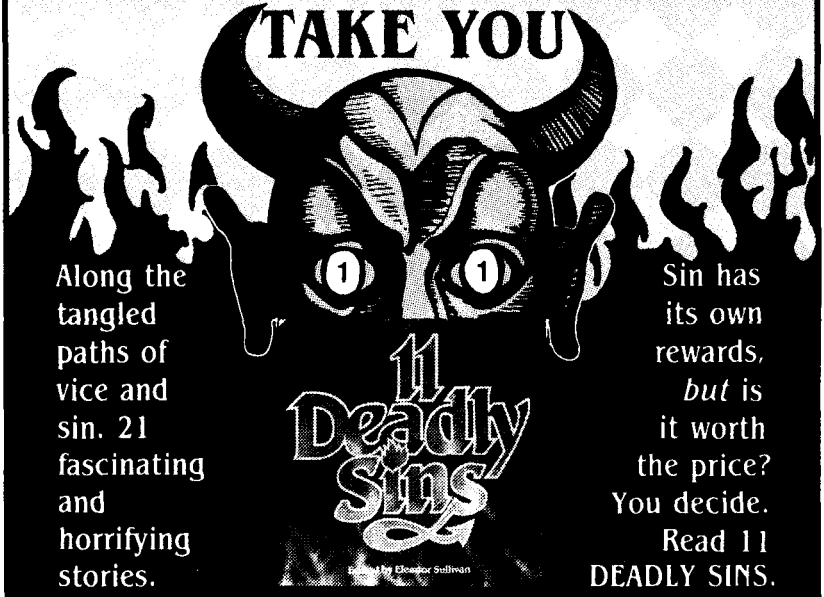

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had wedded him to Gia far more thoroughly than the words of their marriage ceremony. Yet there remained a core of unease which he knew was also part of the mystery in this valley. Also remaining was knowledge that the decisions were his now, that leadership had fallen on his shoulders and had been accepted by the others. He was not particularly happy about this development, although neither was he sorry. He was not even curious how or why it had happened.

Kurber produced a small pair of binoculars and examined the way ahead. "There is a small cairn down there." He expanded the field of view. "Another on that far slope. At least, I think it is a cairn—" The built-in focus/intensifier did its electronic best, but failed to resolve the tiny, wavering image. He lowered the binoculars. "I have seen mirages which were clearer."

Klipis looked incongruous with a device perched on her snout which vaguely resembled old-fashioned spectacles. "Agwee," she said. "Phenomena do stwange zings to way eyes see." She paused thoughtfully. "Or perhaps to way bwain interpwet what eyes see."

Hreomlupfrozzipnkiaplaziz broke his long silence. "Phuili and humans see what planet want Phuili and humans to see. Soon planet punish us who twespass where Phuili and humans alweady told not to go."

The Phuili administrator was undoubtedly close to sanity's edge. Nevertheless even the completely insane have their own form of logic, which caused Gia to ask, "What happened to Cal Bremmer was a warning to us?"

"Iss so."

"Then Harry, if what you say is true, why did you accept our decision to proceed?"

Although there was no physical movement equivalent to a shrug, the woman sensed the Phuili's weary resignation. "Iss better. Zis one see dark side of universe, shadows of dead which not conform physical laws and which contwol fwom places we not see. If logic no longer be, life should no longer be."

'Jase, what do you make of it?'

There was no direct response to Gia's projected thought. Instead, Kurber muttered disgustedly, "That's all we need. A doomsayer!" So the telepathy had been as transient as the froth at the top of a wave, and probably as unimportant. Yet something remained which had not been there before. Between husband and wife, a kind of quiet closeness.

For his part, Kurber sensed that his wife had sent him a direction, like a psychic arrow pointing to a conclusion which startled him. "What did you mean by 'shadows of dead'? Are you referring to what we humans call ghosts?"

Harry did not reply. But something within the alien's ineffably sad eyes caused Kurber to turn to DeGrasse. "Jim, years ago you told me about an episode in your life in which you dabbled in the occult. It was a pretty nasty affair, if I remember. Considering the weird things which have been happening to us up here, is it possible Harry has tapped into that part of your subconscious?"

DeGrasse said mildly, "What you refer to is not exactly what one likes to be reminded about, you know. But if, as you say, Harry—"

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His shrug was eloquent.

It had been the sort of unsavory story which, if not told to a good friend, would probably have been confessed to a priest. A clique of bored yet brilliant students had tapped into a substrate of the human psyche with disastrous results; one suicide, the others marked for life. The possibility that the disoriented mind of the Phuili administrator had somehow linked into that dark corner of DeGrasse's past was chilling yet plausible. The dark and sometimes menacing shadows of the human subconscious would be devastating to a mind which acted mostly on the conscious level, such as the mind of a Phuili. One unknown was the effect of the experience on Harry's innate distrust of humans. Although Kurber wanted to believe that the Phuili's current mental chaos had rendered all of that irrelevant, he had a nagging feeling it would not be a good idea to ignore other, perhaps more unpleasant, possibilities.

And DeGrasse?

Perhaps there had been an exchange. DeGrasse's calm rebuke at being reminded of something which in normal circumstances would have provoked fury, showed a remarkable transformation from the wild man Kurber had wrestled to the ground less than an hour before. There had also been DeGrasse's reasoned acknowledgement of his prejudice against the Phuili; itself a surprising development considering the years he had been "in the closet." But as with Hreomlupfrozzipnkiaplaziz, it would be foolish to assume that things were as they seemed. In fact, there had been changes in all five of them, and the odds were that those changes were still only the fringe.

Kurber pointed. "We will head for the first cairn. Stay close together and watch each other. If anything even slightly unusual begins to happen, for god's sake say so."

Klipis suggested, "Keep mind on cairn. Zink only of cairn."

It was the longest one hundred meters Kurber had ever walked. Three minutes later, as they stopped at the small heap of stones, he felt certain it was the incongruity of their group shuffle which had prevented any telekinetic mischief-making. Gia's broad grin and the hint of amusement on Klipis's normally inflexible features, stimulated the man to ask with a chuckle, "Are we overdoing it, or what?"

Nevertheless the expediter felt a palpable tension which hemmed them in like a psychic wall. Forcing himself to ignore the temptation to inwardly cringe, Kurber examined the stones. "Why the cairns?" he wondered aloud.

"Perhaps each marks a place where Cal nailed down some facet of the mystery," Gia suggested, hugging herself. "Jase, I am cold." She examined her fingers, which were turning white. "I mean it. I am *cold*."

Kurber grasped her hands, and was shocked at the icy feel of her skin. "My god, Gia—"

"It in mind," Klipis said. "You must zink warm."

Gia's eyes widened. "Of course."

Kurber felt her fingers begin to lose their chill. Her face began to flush and her eyes sparkled. "Klipis is right, Jase. All you have to do is—"

"Like hell! You're getting feverish!"

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For a moment Kurber almost panicked as he felt the flesh continue beyond warm to hot, and as his wife began to gasp with distress. Then, just as abruptly the flesh cooled again; finally stabilizing at a pleasant warmth.

Gia gently pulled her hands free. "I am all right now. I can handle it."

"Handle what?"

"I did something stupid. Instead of concentrating on the cairn as Klipis suggested, I invoked a mental image of something I saw when I visited Antarctica a few years ago; an iceberg calving off the rim of the continent. It was then I remembered how cold I was—"

"Don't," Kurber said worriedly. "Don't!"

She smiled. "When Klipis told me to think my way out of it, I switched the image to that of an old-fashioned hearth with a blazing fire. And then when the fire started to take on the dimensions of a forest blaze, I turned my mind to pleasant thoughts of you, dear husband." The smile became mischievous. "—who is definitely not the only one who can play *that* game."

"Umph," Kurber muttered, ashamed to feel flattered while he was so overwhelmingly relieved. To refocus his thoughts, he again turned his binoculars toward what he had earlier assumed was a second cairn. Although the image was only slightly clearer than it had been before, there was now enough additional detail to reveal that he was definitely not looking at a heap of stones. "That's no cairn. It's Cal's tent!"

The watcher was concerned. Although the zone of discontinuance was minuscule, so is the first crack in a dam. First there had been only one entity, now there were five. More would inevitably follow, tapping into and releasing forces they could never understand, exponentially widening the breach toward ultimate catastrophe.

The emergency was now.

So the watcher expanded its awareness to include others of its kind. Within the span of a moment which had no meaning in a continuum in which all times are one, those who were once the builders dispassionately analyzed the problem.

'You know the constraints. We cannot interfere.'

'Yet are not our antecedents responsible for the original error?'

'That is true. Nevertheless the constraints must remain.'

'What is the potential?'

'Theoretically, a complete breakdown of the nine dimensions which form the matrix of the physical universe. But long before that can happen, the young ones in which we have invested so much hope will be destroyed—as that one individual would have been destroyed if it had not semi-successfully projected itself out of the discontinuance. Although the universe will survive, it will survive only as it has always been. A mighty machine without mind.'

'Is there anything which can be done?'

'Not directly. It would require us to reemerge into the universe, which of course violates the constraints.'

'Are you implying that some form of indirect action is possible?'

'You are perceptive. There are, as you know, a few precedents which allow

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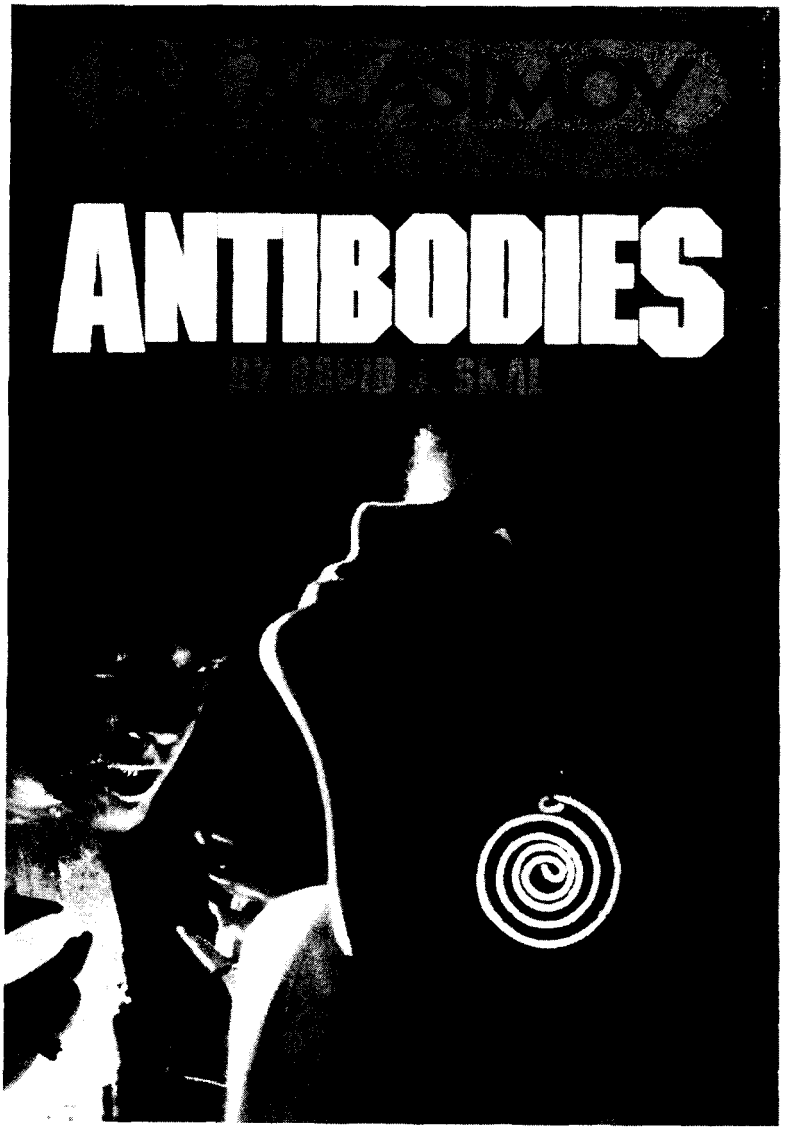

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a slight degree of flexibility in matters concerning the young ones—'

"So he got that far anyway," DeGrasse muttered as he peered at the vague shape of the tent and then tried to pierce the shimmering veil beyond. The pyramid mountain had a wavering outline, as if being viewed with insufficient pixels on a low-resolution screen. Above the mountain the sky was a washed-out gray, except for a V of deep blue which spectacularly mirrored the soaring pyramid. The slopes on either side of the valley were equally indistinct at the lower levels, becoming clearer only as the eye lifted toward where the peaks rimmed the sky.

Despite the physical presence of his four companions, DeGrasse felt peculiarly isolated. He had a sense that he was standing on the lower slope of something equivalent to a gravity well, that if he could go just a little farther — perhaps only as far the tent—he would arrive at a place where all things would ultimately come to him. "I am going on," he announced thickly, forcing leaden feet in the direction he wanted to go. He thought he heard vague voices of protest, felt weak graspings as hands reached for him and then fell away.

It was like wading through molasses, yet he persisted. A guard, gray uniformed with a crooked-cross emblem on his sleeve, snapped to attention. The commandant acknowledged the salute and entered his office.

The report was on his desk. Nominal complement of the camp, three thousand. Actual population crammed into the ill-ventilated and unheated huts, eight thousand. Deaths from "natural causes," one hundred and ten per week. Executions for various infractions, thirty per week. Average rate of replenishment; two hundred and twenty per week. Result; eighty additional dog-faces per week to be fed, housed, and somehow put to work.

The commandant went back outside. A few of the Phuili were working listlessly in the vegetable garden, while others swept the eternal dust off the concrete walks. As the commandant approached, one of the dog-faces uttered a peculiar cough and pitched snout down among the vegetables. A guard ran over, but the commandant waved him aside. Once, he remembered, he had hated these beings enough to wish them exterminated. Now they were merely a nuisance, to be tolerated because they were useful. But at this moment the commandant felt an intense curiosity. What *is* a Phuili? Are they really akin to the hellish manifestations he had experienced during that hallucinogenic-induced craze so many years ago?

With the toe of an immaculate boot, the commandant pushed the body over on its back. Old and emaciated, the dog-face was obviously near death. Yet the expression in the large eyes was not the hate which surely should be expected. Instead, there was understanding. And warmth. Above all, there was sympathy.

Sympathy? For me?

The worst kind of punishment is often reserved for those who retain a vestige of conscience while they abuse the defenseless. In a moment, the distortions of two-thirds of a lifetime were purged out of the commandant/DeGrasse's brain

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with a cascading flood of realization and self-hate. Weeping, DeGrasse collapsed near the abandoned tent.

Power corrupts. Absolute power corrupts absolutely.

Gia Mayland was painfully aware of the old maxim as she tried to relax within the luxury of her self-imposed prison. She was not sure how she had got here, although there were vague, unconnected memories involving a walk through a mountain valley.

But in her role as Secretary General of the Union of Independent States, there was no doubt *why* she was here.

Mighty oaks from litle acorns grow.

Another pathetic little truism among the truisms which she collected during the interminable hours when there was nothing else to do.

She knew when things were going to happen.

With thought alone, she could stop or alter them.

It had started in a small way, when from the other side of the continent she had willed her parents not to take that plane. Knowing what she did now of her powers, she could probably just as easily have disarmed the bomb and saved a few hundred other lives. But she had been selfish then—as she was infinitely more selfish now.

Her grandmother had never thanked her for the extra years granted by the permanent remission of the rare form of cancer which alone among cancers remained medically incurable. The old lady had instead scolded her peculiarly gifted granddaughter for going against the "will of Providence." After that, she who would later become the absolute ruler of the UIS had withdrawn from any further family contact. Parents and grandparent were emotional luxuries she could no longer afford.

A goddess cannot have normal human relationships.

The S.G. did not know if that was in the formal lexicon of truisms. If not, she would make it so by having it inscribed on her gravestone—if goddesses are allowed to die and have gravestones.

Once, there had even been a husband. But that was during another life, before she made deserts green and disarmed armies with a thought. Not many men could have stuck it through so long, watching his wife recede from her humanity as she became a machine for making miracles. Now she was only loved by the billions who could never know her personally; who were benefitting from the bland, stress-free and probably not very interesting world she had created for them. The few who did know her, mostly scientists and government officials, tried nobly to treat the secretary general as one of their own, and she was grateful for the pretence. But they could never entirely hide the fear in their eyes; their urge to escape from her presence even as they forced themselves to remain just a little longer than protocol demanded was necessary.

Altruism in its milder form is not uncommon among human beings. In the vast mid-range between the extremes of saint and sinner, she who was once Gia Mayland had shared that slightly higher ground with many who also shared her devotion to public service. Then the *power* came, and with it the skeptics who labeled her accomplishments as mere coincidence. Yet she had been

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happy then, gauging her success in terms of the people she helped and the injustices she corrected. But the expansion of her abilities beyond those small beginnings had been remorseless, until ultimately—like trying to channel a waterfall into a teacup—it had become too great to serve individuals and small causes. It could never be "he" or "she" anymore, only "they." And even that pluralistic term seemed inadequate for one who was caring for the beach, as opposed to its individual grains of sand.

The secretary general looked out from her tower at the rolling foothills and the mountains beyond. As with everything else, weather-control had become a routine like sleeping and eating (although she was still reluctant to admit to even her closest associates that she was beyond the need of either). She created a small rain cloud, and permitted it to expand until its shadow filled the land between the tower and the foothills. She blinked, and lightning flashed. The accompanying thunder was barely a murmur behind the armorglas of the window-wall. She let the rain fall, and gained a tiny pleasure as the drops hit the window and then collected into bigger drops as they meandered their way downward.

Of all the things she could do, what did she want to do most? What is the ultimate selfishness?

Cancel myself out.

It was not the first time it had crossed the S.G.'s mind. But she had always rejected the idea because she could not imagine how the UIS could get along without her. A billion diapers to change and a billion noses to wipe; she could never abandon them now. Suddenly a tiny figure—a woman—unexpectedly clawed up out of the S.G.'s subconscious.

Like hell you can't!

The world dissolved—

Jameson DeGrasse looked up with surprise as the woman appeared out of the shimmering background and dropped to the dirt next to him. "Made it!" Gia Mayland exclaimed with a mixture of triumph and surprise.

Jason Kurber was the free world's secret weapon. His initial activation had occurred while he was a minor member of a diplomatic team which had been sent to negotiate an environmental treaty with the so-called "Guardian" of the Southern Republics. For nearly a century, the already depleted rain forests of the continent had been protected from the ravages of further uncontrolled cutting and burning. But when General Guederran decided to reward his millions of followers by granting them the forest lands to clear and cultivate, the nervous Organization of World Communities immediately sent its representatives to attempt to persuade him not to cancel the moratorium.

First the general laughed, then forced the entire delegation to witness the ceremonial flogging to death of an SR citizen who had dared to speak publicly against the edict. The general was still laughing when, as the environmentalist's broken corpse was being freed from the bloodstained uprights, Kurber's white-hot anger became channeled into a psychic blast which caused the general's gloriously uniformed body to do its best to turn itself into a pretzel. The Guardian's screams, as bones shattered

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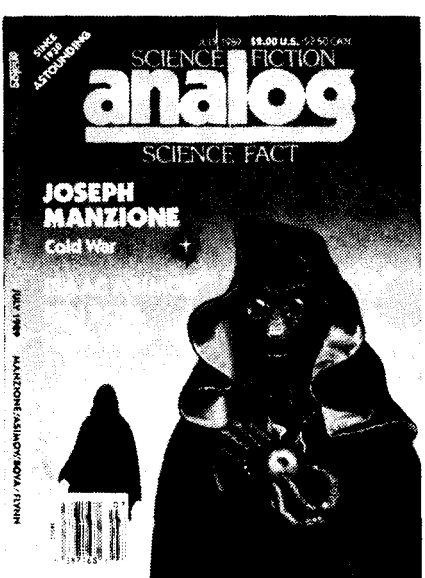

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and muscles tore, were even louder than had been his victim's.

If it was not for the presence within the delegation of a high-placed sensitive who recognized the nature and source of the weapon, Kurber would probably have remained unaware that he was the cause of General Guederran's spectacular demise. There followed months of training, during which Kurber learned that he did not have to be present in person to exercise his deadly talent against an unsuspecting target—just as long as that target presented him or herself as a real-time television image.

The weapon had one severe limitation. It could not be launched unless it was energized by an overwhelming sense of outrage. Nevertheless, certain publicity-hungry petty dictators, drug lords, crime czars and their ilk all succumbed in various unpleasant ways as "Project Justice" gained its stride.

It is human nature to abhor brutality. It is equally human to wish everything from torture to a shooting squad upon its practitioners. But wishing is not the same as doing, as Jason Kurber gradually came to appreciate. Although he had rid the world of a few unpleasant individuals, was it a better place because of it? Was *he* a better man because of it? To the first question, there was still no clear answer. To the second question—

Thou shalt not kill.

In its various forms the commandment was as old as humanity itself, and in its meaning equally complex. There were loopholes which allowed saints to kill with almost as much impunity as sinners, and often as brutally. From Torquemada's Holy Inquisition, to the witch-hunts of Salem, there has always been excuses.

As Kurber had his excuses. The problem was, of course, that excuses are fragile and cannot stand too much repetition. They tend to get thin.

First came the doubts. Then the nightmares. Kurber became afraid to sleep, then found he could not sleep. The sword lost its edge, the World Communities their weapon. Finally, within a locked room of the most heavily defended complex on Earth, Jason Kurber decided to summon the strength and then the outrage to destroy the worst killer of all.

He stood before the mirror—

'It was not as difficult as I anticipated.'

'That is because we introduced nothing which is new. The five subjects were already conditioned by well established value systems. It was only necessary to weaken the partitions which their respective cultures had erected to separate what they see as the conflicting realities of mind and body.'

'It is an astonishing fission of what is, after all, the great singularity which is existence.'

'But necessary for those who are bound by the laws which govern the physical continuum. Until there is universal recognition of what a few of their more daring theoreticians are only just beginning to perceive, their evolution must continue in a strictly linear manner. It is why the discontinuance must be contained before what they refer to as 'time's arrow' begins to spin without direction, and their minds and souls are

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destroyed by what they are not equipped to understand.'

'So be it. I hope those five motes know what they must do.'

'Do not color your judgment of them by arrogance. If they correctly negotiate this hazard, it is possible the ultimate outcome will be better than if the discontinuance had not existed.'

'If they fail?'

'Then the flaw caused by the discontinuance will become a breach, and the breach a chasm which will absorb all things. The galactic mind will die before it is born.'

'There can be no greater tragedy.'

'Agreed. But as we have played our part, now the small ones will play theirs. As is often true in moments of crisis, it is the lesser who must be the greater.'

"What are we?"

"The future, I think," Kurber said as he backed out of the tent and stood up. Cal Bremmer's still-sealed sleeping bag was sagged in on itself, and the pillow still bore the imprint of the old man's head. Cal had clearly made himself comfortable before he conducted his final experiment.

"The future." DeGrasse considered a moment. "If there is to be one, I gather we somehow have to get rid of this—er—mystery." He looked thoughtfully at the flickering scenery. "Do we know how?"

"Do we?" Gia echoed.

Klipis smiled. Normally such an emotion is difficult to read from the relatively inflexible features of a Phuili. But this smile was empathic; radiated from a being who was at harmony with herself and the universe. By most standards, the old Phuili had always been that way. But this was something profoundly more. What had been the form of her revelation? Kurber wondered.

"Each just learn many zings," Klipis said gravely as she looked at her companions. "Iss not twue?"

"About intolewance," Hreomlupfrozzipnkiaplaziz said.

"About intolerance," DeGrasse echoed. A five-fingered hand reached out and clasped a hand with four fingers.

"I was God, or something equivalent." Gia spread her hands. "Believe me, it is a hellish responsibility."

Her husband nodded. "So is being an avenging angel. After a while, you start to realize that instant justice is not necessarily good justice."

"For me, not more doubts," Klipis said. She was the acknowledged leader now, and Kurber was content. Nevertheless, questions remained. "What has been the point?" he asked. "I suppose we are all better people now, but how does it help what we are supposed to do? And who—or what—did it to us?"

Even as he asked the last question, Kurber realized there was no simple answer. The mental playlets they had each experienced had originated within themselves; there could have been no other source. The miracle was the sudden ability to self-examine, to suffer through unpleasant truths and equally unpleasant lies, finally to appreciate the difference. If that had been imposed, so be it. Although Kurber preferred to believe it had all been a natural side effect of the phenomenon which clung around them like a psychic cloud.

The other questions had been unnec-

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essary. To exorcise the problem, they needed to work together. Minutes ago, that would have been difficult if not impossible. Not now.

In her quaint way, Klipis put what they needed to do into words. "We wish it not."

They sat and faced each other; a little circle of five. *We wish it not.*

And then it wasn't.

Gia opened her eyes. She felt weak, hungry, and immensely satisfied. Kurber helped her to her feet. Her husband was haggard, unwashed, and with at least three days growth of beard. Equally unshaven and dirty, DeGrasse groaned to his feet. "My god, how long—?"

"Long enough," Kurber said, rubbing his stubble and looking wide-eyed at the peaceful scene around them. It was just a mountain valley now, dappled with cloud shadows and at peace. Even the pressure in his bladder suggested a delightful normality. A few minutes later as he, Gia, and DeGrasse met again at Cal Bremmer's tent, their two Phuili companions appeared bearing the backpacks which had been left behind at the end of the trail.

The first need was to satisfy their hunger. So they ate companionably and quietly, for the moment needing nothing more than the pleasurable sense of accomplishment.

"I have a feeling that Cal will be back on Serendip sooner than anyone expects," DeGrasse said finally.

Gia nodded. "I am sure of it." She turned to Klipis. "This change in us. Do you think it is permanent?"

"What change?" the Phuili asked solemnly.

Kurber chuckled. "OK, so we are still more or less what we were. Except that before all of this happened, we did not *know* what we were!"

"Semantics," DeGrasse grumbled. "We are the same yet we are different. Face it, this is a situation in which words are inadequate. So let's just accept, huh?"

"I agree." Gia hugged her knees to her chest and stared at the dull glow of the power-pak radiant which added a pleasant warmth to the campsite. "Although I am still unsure exactly what we did here, I do know one thing—"

"Zat we are wiser?" Harry asked.

"Yes." Gia held up a hand with thumb and forefinger almost touching. "But only that much."

'It is unfortunate that the breach remains unsealed.'

'That would have been too much to expect. It is sufficient that the young ones believe they have eliminated the problem.'

'Yet sooner or later they are bound to discover that they merely displaced the discontinuance a few diameters off-planet.'

'There is little reason for any of their spacecraft to be in that particular location. Nevertheless, because rediscovery does of course remain a statistical possibility, it becomes necessary to continue the watch.'

'So be it. The watch continues— ■

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Reaching for the Stars by Mark Mercury

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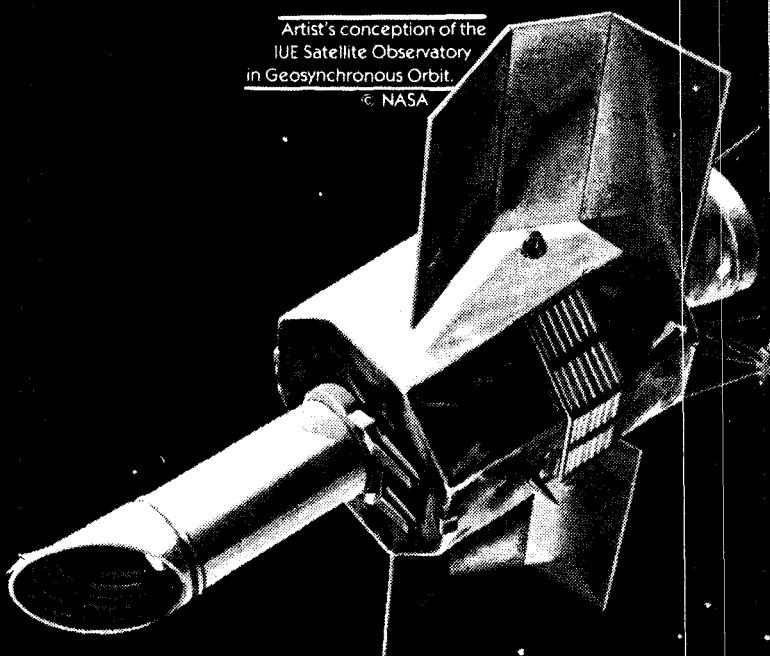

Artist's conception of the
IUE Satellite Observatory
in Geosynchronous Orbit.
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IUE, THE FIRST GEOSYNCHRONOUS ORBITING OBSERVATORY

Yoji Kondo

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The age of space astronomy was ushered in when the World War II German V2 rockets became available for carrying scientific payloads above much of the Earth's atmosphere. The Sun was the first astronomical object to be observed from rockets, thanks to its extreme brightness. By the 1960s, sounding rocket technology advanced to a point where non-solar sources could be studied in increasing detail.

Through the use of rockets and high-altitude balloons, the electromagnetic window hitherto inaccessible to the ground-based observer has opened up. Observations were first made in the ultraviolet, then in the X-ray and in the infrared, revealing a number of objects unknown before the advent of the space age. Among such discoveries were X-ray emitting binary stars containing collapsed stars.

However, rockets went up and came down quickly, providing a scant few minutes of observing time. High-altitude balloons extended observing time to several hours, but it was still not enough. Besides, there were spectral regions that were not accessible from balloon altitudes of some 40 kilometers (25 miles). The future of space astronomy clearly rested with orbiting astronomical telescopes whose useful lifetime would be measured in years.

Shortly before Neil Armstrong and Buzz Aldrin's landing on the Moon, the first successful launching of an Orbiting Astronomical Observatory (OAO) took place. Within a few years, it was followed by another OAO, which was christened *Copernicus* to commemorate the 500th anniversary of the astronomer's birthday in 1473. In the early 1970s, two other ultraviolet satellites were launched by the Europeans. America's Skylab also carried an ultraviolet telescope, which was operated by the astronauts. It was also about this time (1970) that the first X-ray satellite. Small Astronomical Satellite A, was launched from San Marcos platform off the Kenyan coast. The launch took place on the Kenyan Independence Day; to honor the occasion, the satellite was named *Uhuru,* meaning *freedom* in Swahili. The story of discoveries from this and other X-ray satellites that followed it is also a fascinating one. However, in this article I would like to talk about a remarkable astronomical satellite called the International Ultraviolet Explorer (IUE).

The IUE, which was launched on January 26, 1978, has brought about dramatic changes in the way space observations are made. Because of its geosynchronous orbit, the satellite observatory is always in the line of sight from its control center at Goddard Space Flight Center near Washington, D.C. The orbit is elliptical and the IUE is visible ten to eleven hours a day from the European Space Agency (ESA) ground station near Madrid, Spain. The IUE is a collaborative work of NASA, ESA, and the British Science and Engineering Research Council.

The IUE is operated 24 hours a day, 16 hours from Goddard and 8 hours from Madrid. Since it is well above the atmosphere, its observing capability is not affected by phenomena such as weather and sunrises. The 45-centimeter aperture telescope is equipped with

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ultraviolet spectrographs that record astronomical spectra between 1,150 and 3,200 Å. (Wavelengths shorter than about 3,000 Å are not observable from the ground.) The spectrographs can be operated in low (6 to 7Å) or high (0.1 to 0.3Å) resolution mode. The spectra are recorded on special ultraviolet-sensitive television cameras called Secondary Electron Conducting (SEC) Vidicons.

Astronomers come either to the observing facility at Goddard or to her sister station near Madrid. As the actual operation of the satellite is complex and requires special skills, the guest observer is assisted by a staff of resident astronomers and telescope operators. Out of necessity, operations of low Earth orbit astronomical satellites are preprogrammed, and that removes a degree of freedom and flexibility in making observations. In contrast, the geosynchronous IUE satellite is operated with a high degree of flexibility, much the same as ground-based telescopes. The observer can adjust his observing plans in *real time* after examining the *quick-look* spectra telemetered to his console from the satellite. This makes for productive use of valuable telescope time.

IUE's continuous 24-hour observing capability makes it possible to observe faint astronomical objects. The brightest star observed was Sirius at -1.4th magnitude, whereas the faintest was a 19th magnitude hot star in the Large Magellanic Cloud. The dynamical range attained with this telescope is therefore about 100 million. The continuous observing capability also makes it feasible to monitor variable astronomical sources without interruption. Those unique features of the IUE have made it an extremely productive facility despite its modest mirror size.

Guest observers have come from all corners of the world, including all of the six continents: North America, South America, Eurasia, Australia, Africa and Antarctica. (Granted, nobody lives permanently in Antarctica at the moment but at least one guest observer had worked in Antartica before coming to Goddard.) Since its launch in 1978, over 1,600 different astronomers have used this geosynchronous observatory. Since the astronomical community is relatively small, this figure represents a very substantial fraction of all astronomers actively engaged in research, particularly those in North America and Europe.

Over the past decade, the IUE has come to be known as the most productive telescope in the Solar System. (Regrettably, we have no information on the productivities of telescopes used by ETs.) Counting articles published in refereed journals alone, 1,471 scientific papers had been published by the end of 1987, a few weeks before the tenth anniversary of its launch. Although productivity is an important factor, the most important criterion for a successful scientific project is its impact on science. The selected highlights that follow will give you some idea of IUE's contribution to astronomy.

Astronomical objects studied with the IUE range from Solar System objects like planets and comets to the matter between the stars and galaxies, all sorts of stars including white dwarf stars and

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binary stars, external galaxies and remote quasars. Let us begin with the Solar System.

(I) Solar System Objects.

The first space observations of Halley's comet were made with the IUE in September 1985. The comet was monitored throughout its stay in the inner Solar System for about a year. The last space observation of Halley was also obtained with the IUE. When the tragic accident of Space Shuttle *Challenger* caused the cancellation of the planned ultraviolet observation of the comet from the Shuttle, we promptly rescheduled the IUE and obtained much-needed observations contemporaneously with the Halley intercept missions, i.e., ESA's *Giotto,* U.S.S.R.'s *Vega 1* and *2,* Japan's *Sakigake* and *Suisei,* and NASA's *ICE*. IUE observations provided valuable data on the physical conditions in the cometary coma and tail. For instance, near the perihelion (closest approach to the Sun) point, it was estimated from the observed intensity of the hydroxyl emission that the comet was ejecting water at a rate of over ten tons a second.

Over two dozen comets have been observed with the IUE. Particularly noteworthy was the observation of Comet IRAS-Araki-Alcock, discovered in 1983 by infrared satellite and two comet watchers. The comet came quite close to the Earth (within a mere 5 million kilometers), which made it possible to detect the totally unexpected sulfur dimer emissions in its far ultraviolet spectrum; it has been suggested that the sulfur molecules were accreted onto the comet in interstellar space.

Planetary aurorae have been observed as hydrogen Lyman-alpha emission on Jupiter, Saturn and Uranus. The data provide important information on the magnetic fields and upper atmospheric conditions of these planets.

The gas emitted from the Jovian satellite Io has been monitored with the IUE since the Pioneer flyby mission's discovery of its volcanic activities. The sulfur ions from the volcanic gases form a plasma torus around Jupiter, which is guided by the strong Jovian magnetic fields. Upon seeing the sulfur emission from the volcanoes, an astronomer exclaimed, "Hey, this is one *hell* of a satellite!"

(II) Gas and Dust Between the Stars and Galaxies.

The gas between the stars is normally studied as absorption spectral lines superposed on the spectrum from the star behind. Because of the temperatures and densities of the gaseous matter in space, its absorption spectra are strongest and most numerous in the ultraviolet region. The study of the interstellar dust is performed primarily by observing the manner of scattering of the star light; due to the size and properties of the interstellar grains, the scattering peaks in the ultraviolet. The IUE's capability to observe faint stars and galaxies at great distances in many directions has made it possible to map the physical conditions of interstellar matter as has never before been possible.

The Solar System is currently traversing an amorphous gas cloud some twenty light-years across. The average

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density of the gas is about one atom per ten cubic centimeters, making it a better vacuum than any attainable in a terrestrial laboratory. Its temperature is around ten thousand degrees Kelvin; probably more than half of the hydrogen atoms are in ionized form. The Sun, located near an edge of the local interstellar cloud, is traveling at a relative velocity of about 20 kilometers per second toward the center of this cloud, where the density may increase to a few atoms per cubic centimeter; that would still be a pretty good vacuum by laboratory standards. An increase in the density of the interstellar space may subtly affect the solar-terrestrial relationship in a few tens of thousand years. This amorphous cloud is surrounded by an extensive sea of hot (hundreds of thousands of degrees) and thin (an atom per 100 to 1,000 cubic centimeters) plasma. This hot gas apparently extends hundreds of light-years in a number of directions, although there may be imbedded therein islands of amorphous gas cloud.

What does this all have to do with us, aside from its intrinsic scientific interest? Well, for one thing, it would make the idea of interstellar ramjets rather unrealistic. The ramjet starship would scoop up the interstellar hydrogen and use it as the source of energy for its propulsion system; the end product of the fusion and helium could be used as reaction mass. This bootstrap method of traveling to another star is a charming idea. However, with a density of about one atom per 10 cubic centimeters, a ramjet with a (magnetic?) collecting area of 100 square kilometers can scoop up only 3×10^{19} hydrogen atoms per second if the ship is traveling at a hundredth the velocity of light. About 0.7% of the total mass of hydrogen is converted to energy in a fusion process. Accelerating a thousand-ton-starship to a hundredth of the velocity of light would require 4.5×10^{25} ergs of energy, even assuming an unrealistic 100% efficient propulsion system. It would take several millenia for this ramjet to scoop up that much hydrogen, disregarding the fundamental problem of accelerating the ship to that velocity in the first place.

Would this make a starship a daydream then? Not necessarily. Given an appropriate source of energy, interstellar journeys are definite possibilities as long as we have the will and determination to achieve them. Even a simple-minded extrapolation of today's science and technology, without invoking the discovery of unknown scientific principles, suggests a few possible solutions to the problem; however, those are outside the scope of this article.

The patchiness of the distribution of the interstellar gas and dust also suggests intriguing ideas. The density of matter in some regions of space is many orders of magnitude greater than that encountered in the solar vicinity. What if the Solar System had passed through a particularly dense region sixty million years ago? Would that have affected the solar-terrestrial relationship to such an extent that it would have caused the extinction of those friendly dinosaurs?

As we get out of the galactic disk, we encounter the galactic halo gas, which was discovered by the IUE. This halo gas is quite tenuous and fairly hot, and its physical properties are still being

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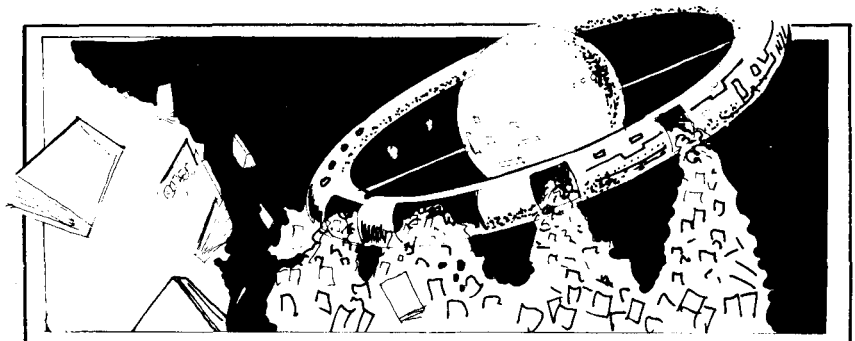

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probed in detail. It turns out that other galaxies also have such halos. The ultraviolet spectra of remote quasars, for instance, show multiple hydrogen Lyman-alpha absorption lines, which arise as the light from the quasars passes through the halos of several galaxies before reaching us. Depending on the velocity of the galaxy, each absorption component is red-shifted to an appropriate wavelength. These multiple absorption lines have been dubbed Lyman-alpha forest for their appearance in the spectrum.

(III) Winds from Stars.

Circumstellar gas is normally observed as atomic absorption superposed on the stellar spectrum. (Here, we will not delve into the thorny problem of how to tell the circumstellar gas from the interstellar gas.) If the gas is moving toward us, the absorption spectrum will be Doppler-shifted toward a shorter wavelength. If that velocity is greater than escape velocity, the gaseous matter is leaving the star. Such a phenomenon is known as stellar wind. The IUE observations show that virtually every kind of star is losing matter, from cool stars to hot stars, from young stars that are being born to evolved giants and supergiants, and even to certain classes of white dwarf stars. To give you an idea of the scale of the gas flow, some supergiant stars are losing more than the total mass of our planet each year.

These findings have a profound effect on theories of stellar evolution, since current theoretical models often do not include the effect of mass loss from the stars. Such new results are also improving our knowledge of how the interstellar medium is replenished.

(IV) Stellar Dynamo.

The visible surface of the Sun is called the photosphere, and has a temperature of about 5,600 degrees Kelvin. Just above the photosphere is the chromosphere, which is hotter (a few tens of thousand degrees) but more tenuous, making its observation difficult except during a total solar eclipse. Above the chromosphere is the corona, a region of very hot (over a million degrees) but extremely tenuous gas. It has long puzzled astrophysicists how the chromosphere and corona could be heated to temperatures substantially higher than that of the photosphere. (At the center of the Sun the gas is quite dense and its temperature is in the range of tens of million degrees; it is so dense and hot that nuclear fusion takes place.) Since the spectral signatures of chromospheres are most prominent in the ultraviolet, IUE observations enabled a study of a large sample of stars possessing a chromosphere. It has been found that magnetic fields are the important carriers of energy to the upper atmospheres (stellar dynamo theory). In some stars, acoustic shock waves also play a role in transmitting energy outward.

(V) Interacting Binary Stars.

Roughly two-thirds of all stars in the sky are estimated to be members of binaries or multiple star systems. The components of some binary stars are so close to each other that they affect the evolutionary processes in each other. It

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turns out that a number of exotic astronomical objects belong to binary systems, e.g., X-ray sources involving collapsed stars, and novae. We have learned that novae occur in binaries containing white dwarf stars. IUE observations contributed significantly toward unraveling the mysteries of novae. A popular theme in science fiction has been the Sun's becoming a nova, but it seems that we need not worry about that any more. (I am willing to take any odds in betting that the Sun will *not* become a nova. I cannot possibly lose. Besides the implausibility of such an event, the winner would have to be alive to collect the money.)

IUE data have been invaluable in providing information on the mass flow phenomenon in interacting binaries. In addition to the fact that mass flow is important while the binary is evolving to become an X-ray binary, the X-ray emission itself results from the mass flow from the companion star to the collapsed object, be it a white dwarf, a neutron star or possibly a blackhole.

(VI) The Brightest Supernova since Kepler's in 1604.

The brightest supernova since Kepler's detection of a galactic supernova in 1604 was observed on February 24, 1987. When the report of the discovery reached us by the quickest route, i.e. through the grapevine, the IUE was immediately pointed toward the supernova. In fact it was the first telescope to do so after the report of the discovery. It was the first time that a supernova was observed in such detail, especially so soon after the discovery, and certainly the very first time it was ever observed at a high spectral resolution in the ultraviolet. (Several supernovae are discovered in remote galaxies each year. However, because of their faintness, discovery is usually not so prompt after the initial outbust and, in any case, none has been bright enough for such in-depth observations.)

This supernova, catalogued as SN1987A, has been studied quite intensively. It occurred in the Large Magellanic Cloud at a distance of about 160,000 light-years, which means that the explosion actually took place some 160,000 years ago. Although it occurred at such an immense distance, because of its absolute brightness it became a third magnitude star, clearly visible to the naked eye. From the pre-explosion photographic plate, it was found that there had originally been three stars in the area. The supernova has been so bright that photographs taken in visible light are even now still overwhelmed by the light from the supernova and cannot be used to determine which star really exploded. At first SN1987A was also extremely bright in the ultraviolet, but it faded rapidly in that wavelength. In three days, its ultraviolet brightness diminished by a thousand fold. In its wake were seen the spectra of the two remaining stars. From the IUE data, it was determined that it had been a blue supergiant star catalogued as Sk -69° 202 that had blown up. This was the first time in history that the progenitor of any supernova had been identified.

Apparently, the dense iron core of the supergiant could no longer withstand the increasing mass of the core as more and

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more material turned into iron through fusion. The stellar core finally collapsed. The gravitational potential energy released in the implosion gave rise to the cataclysmic explosion that was observed as the supernova. The collapse also produced elements heavier than iron that could not be produced through the normal fusion process in the core, as that process would require inputs of energy from outside. Elements like copper, nickel, silver, and gold can only be created in the core collapse. If you are wearing a gold ring, that gold was cooked inside a supernova billions of years ago. Our bodies contain a number of elements that were created in a supernova. The collapse of the interstellar cloud that created the Solar System might also have been triggered by the shock from a nearby supernova some four and a half billion years ago. We probably owe our very existence to a supernova!

If a neutron star was formed at the time of the implosion, we might be able to observe a brand new pulsar when the radio clutter clears up in several years. The observational data, including the detection of the neutrino bursts observed at Kamioka, Japan, and in a salt mine in Ohio supports the possibility that a neutron star was born. One of the intriguing byproducts of SN1987A was the observed neutrino events which suggest that the mass of the electron neutrino is around three electron volts. That is only a 150,000th of the mass of an electron, but since neutrinos are probably the most abundant particle in the universe, neutrinos with mass would have important cosmological implications.[1]

(VII) Active Galactic Nuclei and Quasars.

Among the interesting IUE results on extragalactic objects is recent observation of the temporal variations of the continuum and emission spectral lines in the Seyfert galaxy Fairall 9. Seyfert galaxies, so called in honor of the astronomer who first studied these objects, harbor a very energetic central region. The energy emitted from the core region of a Seyfert is many times that from a typical galaxy and is sometimes comparable to that from a quasar. Both Seyfert galaxies and quasars may contain the same sort of "energy machine" at the center. The gravitational potential energy of a very massive (millions of solar masses) black hole, which is accreting matter from its surroundings, is currently the model most often invoked. IUE observations have shown that there is a delay of 155 days between the brightening of the inner part of the putative accretion disk and that of the outer disk. This is a process that demands much patience, but step by step we may be gradually seeing what makes quasars tick.

Telescopes in space, which can observe astronomical objects from above the image-distorting atmospheres, also opened up the possibility of attaining the theoretical limit in optical image resolution, known as the diffraction limit. (Of course, if you look *down* with your

1) For further reading on this subject, refer to Richard Matzner and Tony Rothman's fact article, "The New Neutrinos," in the May 25, 1981 *Analog*.

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telescope as you would with a spy satellite, you are still confronted with the atmospheric blurring problems.) The resolving power of the diffraction-limited telescope depends solely on the diameter of the mirror; thus, a modest 25-centimeter aperture diffraction-limited telescope in space can match the resolving power of the great 5-meter reflector at Palomar Mountain.

However, diffraction-limited optics have not yet been put to productive use because of the technical difficulties that must first be overcome. The 240-centimeter Hubble Space Telescope, which is scheduled for launch from a Space Shuttle within about a year, has been designed to make full use of its diffraction-limited mirror. By its ability to focus light more sharply, it should enable observation of astronomical objects, such as remote galaxies, some 50 times fainter than the current limit. The present distance limit of the observable Universe would be extended by a factor of $\sqrt{50}$, or about 7 times. Since the current distance limit is estimated to be between 10 and 15 billion light years, some astronomers think that we might be able to look back at the cosmic fireball at the time of the original Big Bang, which was supposed to have occurred only a couple tens of billion years ago. (Looking at an object 10 billion light-years away is looking 10 billion years into the past since the light one is observing now left the source that many years ago.)

We may or may not see the cosmic fireball with the Hubble Space Telescope. It might even be something of an anticlimax if we did. Based on our past experience, one would be inclined to speculate that the HST is likely to answer many important astrophysical questions but will in turn present new and even more fascinating problems. The most exciting era of space astronomy is yet to come as we press on toward the next century. ■

ABOUT THE AUTHOR

Yoji Kondo is NASA Project Scientist[2] for the International Ultraviolet Explorer (IUE) satellite observatory at Goddard Space Flight Center. He is also Professor of Astronomy and Astrophysics at the University of Pennsylvania. He recently (1985-88) completed his tenure as president of the International Astronomical Union's Commission on Astronomy from Space.

He has a Ph.D. in astronomy. He once headed the astrophysics program at NASA Johnson Space Center and also served, on adjunct appointments, as professor both at the University of Oklahoma and at the University of Houston. More recently, he was visiting professor at the Institute of Space and Astronautical Science in Tokyo. He has published 117 scientific articles in refereed journals, 78 articles in conference proceedings and periodicals, 64 meeting abstracts, and 6 books as editor.

2) In plain English, IUE Project Scientist is director of the IUE observatory.

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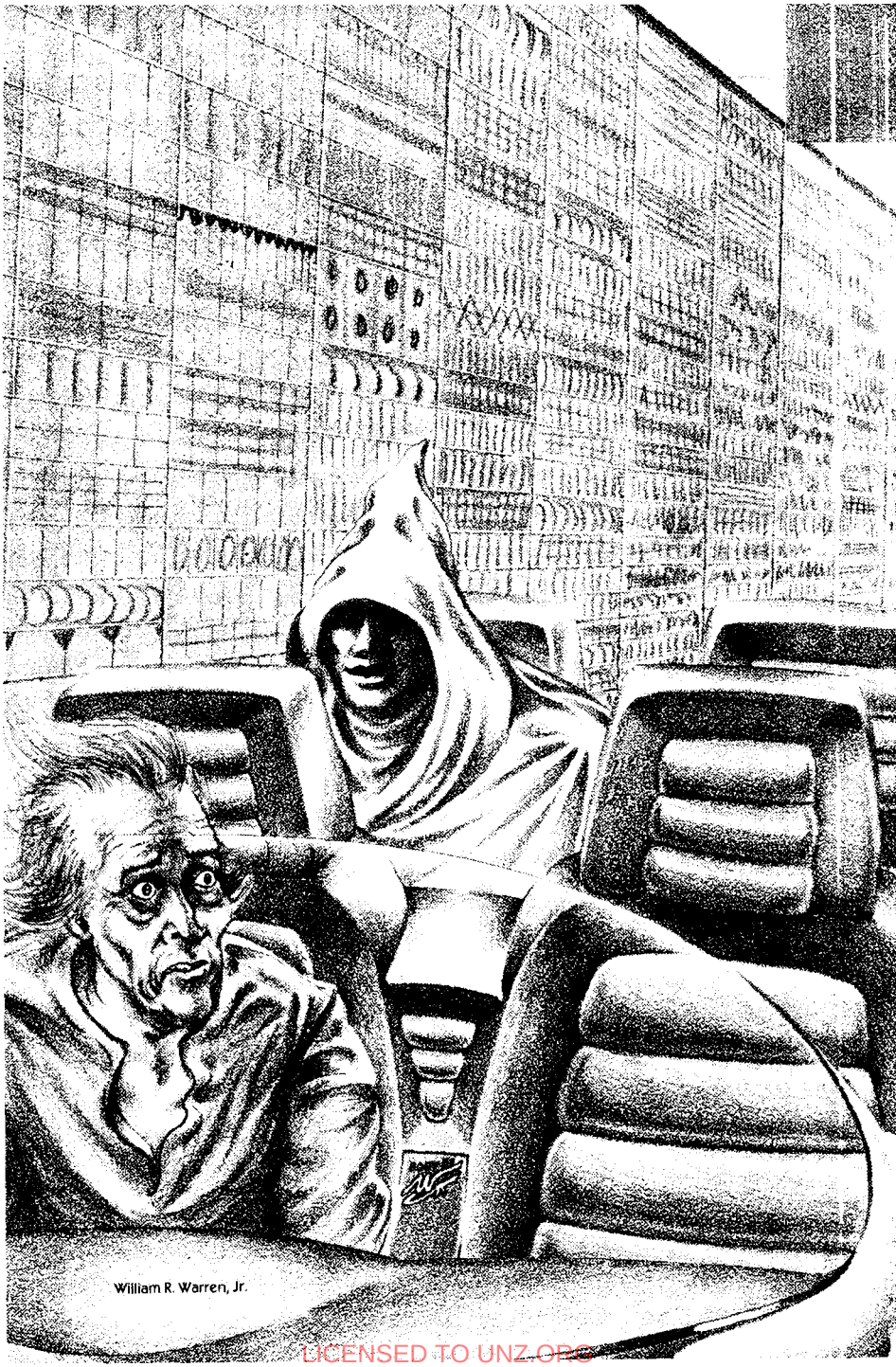

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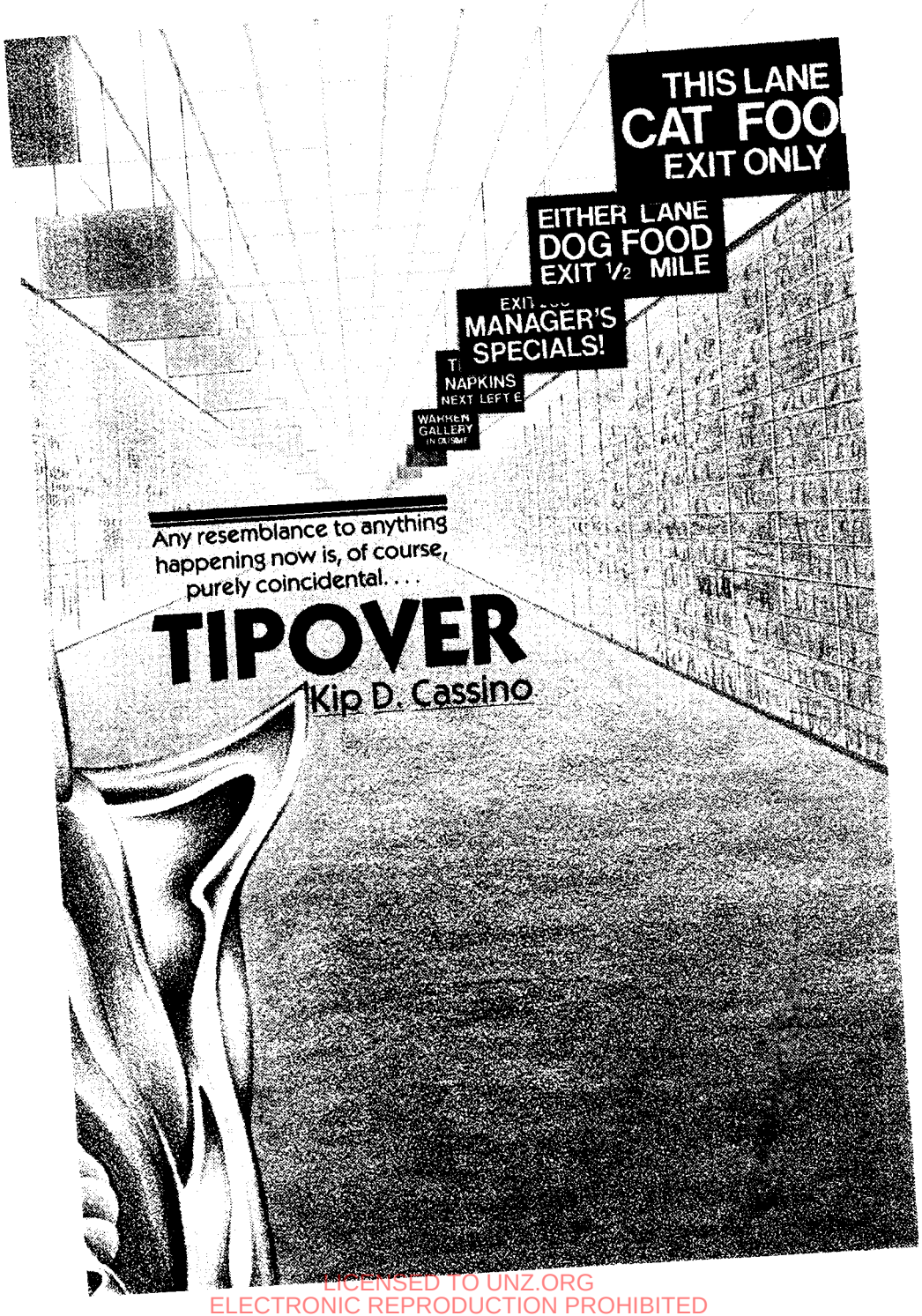

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Shopping day! Malcolm Donkin's favorite day of the week. He never used a list or coupons. No. Shopping was an adventure in sight and choice, the result of which would dictate his comfort during the seven days to come. So, comp in hand, Donkin set out for the supermarket.

Because he disliked crowds, Donkin usually shopped around midnight. It was too easy for an older man to become confused and lose track of the entrance he'd used, or even his parking place, during the breakneck hustle of midday. Since the parking fields of even a mid-sized store averaged five square miles, memory loss or confusion could mean hours of frustration on the parking lot jitneys.

As he approached the market, Malcolm breathed a sigh of relief. The fields were almost empty. He'd be able to park close enough to actually walk to the store. (Of course, no one ever did. There was no way to get in, except through the jitney portals.)

The ride to the store was short, abrupt, and Donkin was the jitney's only passenger. It seemed to him as though the previews of TODAY'S SPECIALS had just begun when the little bus linked to the off ramp. Alone, he walked to the holding area, selected his shopping car (a late model Toyevy, perfect for some of the narrower aisles) and linked his comp to the store data base. Linkage complete and tested, he engaged power and swung the car into aisle 459 (MEALS, PRE-PREPARED— IRRADIATED). "I'll take the local lanes south to 100," he thought, "then return here by express." Though he was not aware of it, part of Donkin's shopping enjoyment stemmed from childhood memories of driving with his father, almost a century ago—when the highways themselves were navigated by unaided humans.

He idled past the shelves at barely more than a walker's pace, seeking his first purchase. As he often thought to himself, "The first one sets up the whole evening!" Soon he spotted an inviting package, a wrapper promising a better than average meal—so Donkin picked it up from the shelf. A prudent consumer, he scanned before placing it in his purchase basket. "Results?" he asked his comp.

"Regression of ingredients against the nominal NIH model indicates—"

"Plain English, dammit."

"I have looked at what this stuff's made of, compared to what the government says you should eat. The first ingredient—"

"Summary only."

"Don't buy it. Put it back."

Donkin stared at the comp in his hand. During shopping, he hated advice from machines. "Why, explain, plain English, summary," he intoned softly. Bad form to disturb other shoppers, many of whom were engaged in their own private conversations.

"The ingredients in this food, if consumed in moderate quantities during the coming year, raise your probability of contracting one or more of eight varieties of cancer by 1.2 percent during the next decade. If you buy it, your medical insurance premiums will automatically be increased by 12 percent to cover this heightened probability. First premium at the new rate will be due tomorrow. Penalty, if not paid, is cancellation by

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week's end. You won't have enough in your account to cover this expense till payday. Payday is next week."

"I promise to eat it just this once," Donkin whispered, wondering at a feeling that could only be compared to that of a child asking for cookies before dinner.

"Based on previous behavior, your med insurance profile won't accept your statement. You tend to repeat purchase of enjoyable foods."

Donkin reluctantly returned the can to its place on the shelf. "I'm too old to accept this life," he muttered. He stopped in the broad aisle of the supermarket, staring again at the comp. "Telephones used to be this size," he thought to himself, remembering his youth. "But they were just as bad. Always ringing at the wrong time."

Squaring his shoulders, Donkin resumed this shopping ordeal (THE MOST FOOD, THE MOST POSSIBILITIES ran the store's ads, NOBODY GOES AWAY HUNGRY), one of thousands intent on finding an actuarially acceptable meal.

By the first decade of the 21st century, it became clear to researchers that everything causes cancer. No diet was safe. Low cholesterol, high protein, no meat, all meat, no preservatives, all natural—each had its toll, which varied greatly from individual to individual. Beyond food, polyurethane, microwaves, polishes, contact with animals, sunlight, too much exercise, too little exercise, concrete, wood products . . . the list of possible cancer-inducing agents grew endless. As did the effects. A total of 12,187 separate and distinct cancers had been identified. And these included only severe cancers—those which could and did cause death in humans.

Western civilization teetered on the brink of chaos. According to the best science could discern, there was no safe path for man. All activity, including eating and sleeping, brought him measurably and predictably closer to an untimely end from an awful disease. Health insurance premiums skyrocketed. The wealth of nations seemed in jeopardy—for who could pay the medical bills of an entire population? The answer came not a moment too soon.

The development and production of the "ten-chip" had made man-machine communication possible and practical. No more keyboards. The comp (as it was now called) understood speech and answered just as easily. Comps ranged in size from hand-held personal models (about the size of a telephone handset) to "open" networks which could handle an essentially unlimited number of operations. Cheap enough to give away, personal comps became every citizen's birthright—distributed at the hospital, along with his social security number.

"Let's assume everyone starts with a blank slate," stated the Leading Scientist of His Day (not entirely true, of course. Hereditary effects, as well as the diet and activities of the mother had to be considered. . . . and were). "It's only what he does after he's born that leads to the probability of one or more cancers. If we keep track of every act, our comps can keep a running total of that individual's probability of getting cancers. So, we can assign his health insurance rates accordingly. Life can go

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on. . . . until, of course, we find The Cures."

Track every activity by every citizen? "Well, why not?" said the insurers. "We certainly have the computing power. And it puts everyone's fate into their own hands. It's the American way." And so it was.

Donkin considered himself as patient as the next man, but this was getting ridiculous. Over an hour had passed, and he was still stuck on aisle 459. Over 200 possible meals had been scanned—and rejected. His shopping trip had become a disaster. In desperation, he stopped the car again. "Comp," he whispered.

"Scan?" came the reply.

"Advice," said Malcolm. "I've given you hundreds of items, and all of them raise my med premium. I'm tired. I just want to go home. Give me a selection I can buy that works, so I can get out of here."

"Wait while I consult the market data base," then, almost immediately, "query completed."

"I'll turn over car control to you, then." Donkin was grim. For all the "options" present in the world, to him it had become a strangely sterile place. "Fun" was harder and harder to find, and now one more minor pleasure had been erased—at least for this week.

Resignation turned to irritation as comp guided the car to the exit terminal. "System check," he spat. "You screwed up and ignored a command."

"No," answered comp.

"Then take me to my food purchases, like I asked!"

"No."

This was maddening. Donkin struggled to maintain his self control. "Query," he said at last, "why can't you comply? Explain fully. Use plain English. Keep answers to short sentences."

"OK," replied comp. "I have complied. No meals in the store meet your criteria. All will push your premium up at least 5 percent. Shopping's over."

"Tell me more."

"You're at a tipover point. Anything you eat or drink will raise your premium."

"Bread and water?" Donkin began to feel desperate.

"Sorry."

"Are you telling me that I can't eat anything for a week? That I have to exist on water till payday?"

The small machine paused for an instant. "If you could find pure water, maybe . . . wait a second. Yes, that would work. But there is no PURE water anymore. Not even on the Moon. All of it has some contaminants, and one's as bad as the next for your med profile."

"What are you saying?" Donkin couldn't believe what he was hearing. "WHAT AM I SUPPOSED TO DO?"

"Your question is unclear. You may do whatever you wish, within the bounds of credit and legality—except eat or drink for the next week."

By this time, Donkin's car was next in line at the debarkation platform —directly behind a flashy Caddy. In a sudden, unexpected clangor of bells and sirens, the larger car began sinking out of sight. As Malcolm watched, the Caddy—driver, groceries and all—was lowered by hidden platform to the

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"maintenance/stocking" level under the store's shopping area.

So shaken was Malcolm that it took him a few seconds to realize what was happening. "Overcharger," he thought, knowing that the driver—whose credit was scanned insufficient to pay for the groceries he had chosen—would be tried, sentenced, and jailed right there in the supermarket's basement. Punishment was light, he had heard—a couple of days of shelf stocking or car polishing. "No chance of that for me," he reflected, staring again at his empty basket.

Although his roadster was parked nearby, Donkin sat in the jitney for more than an hour, trying to collect his thoughts. His head was spinning and—although he'd eaten a few hours ago—he could already feel the awful emptiness of starvation in his gut. Finally, he addressed his comp.

"Assessment," he muttered. "Summary. Plain English. What are my chances of living through a week without food or water?"

"Surprisingly good, considering your age," the little machine chattered back. "About 32 percent, if you get to a hospital by the third day. I will make sure that they keep you on your own recycled liquids, and that they don't feed you until your paycheck is deposited."

"Thanks," said Donkin. No reason to argue with a comp. How could a lump of gallium arsenide understand that without food, work (hence pay) would soon cease?

"Not as though it's much of a job," he thought to himself. (Malcolm was a bugstop at the local post office, taking care of the delivery of messages which Post Office programs—for one reason or another—could not decipher and route. These decreased each year, as the programs corrected themselves, but there would always be enough to justify a few Donkins—more or less.)

"Might as well go home," he finally decided, and looked up to see when the jitney would pull next to his parking area. As he did, his eye was caught by the ad screen, above the vehicle's front. In place of the normal specials, the screen was now showing a very different message. "IF YOU'VE BEEN TOLD YOU CAN'T EAT, LOOK BEHIND YOU," it read. Intrigued, Malcolm looked back to see a heavily robed and cowled figure sitting in the jitney's rear seat. When had he gotten on? About to speak, Malcolm was silenced by a gesture, and directed back to the screen.

"DON'T TALK," the screen now read. "FOLLOW MY INSTRUCTIONS. FIRST, IF YOU'RE WILLING TO LEAVE YOUR COMPUTERIZED RUT IN ORDER TO REMAIN ALIVE AND OUT OF THE HOSPITAL, RAISE YOUR HAND." Donkin quickly complied.

"GOOD. WHEN I SIT IN THE SEAT IN FRONT OF YOURS, I'LL HOLD UP A BOX. PUT YOUR COMP IN THE BOX." The cloaked figure seemed to glide up the aisle, and rested in the seat to his front without a sound. When the yellow box was presented, Donkin hesitated. "PUT IT IN NOW, OR I LEAVE," read the screen in emphatic red script. "NO SECOND CHANCES."

Heaving a sigh, Donkin complied, and placed the comp in the box. He had been born before they were developed,

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and so remembered life without one. Still, how many years had it been since he had been without his? He started to speak, only to be silenced once again with a vigorous gesture. "QUIET TILL WE'RE OUTSIDE," the specials board explained. "THE BUS IS BUGGED."

In ten minutes that seemed to pass like hours, the jitney reached Donkin's parking area. As he alighted from the little bus, he turned to the mysterious figure behind him with a million questions buzzing in his head.

"Wait a minute," laughed a pleasant, young, and very female voice. "I promise you'll have all your answers, just be patient. And your comp is perfectly all right. Right now, it's getting a simulated ride home in your car, complete with conversation. You'll have it back before the night's over. Now, we have a lot to do and not much time. Get in your car—I'll drive. My name's Suzi. Pleased to meet you, Malcolm Donkin."

As they turned to his car, she pulled back her hood to reveal an attractive face framed by auburn hair. (She reminded Donkin of an actress' picture his mother had shown him once. What was the name? Doretta Young, he thought.)

"Suzi, what's this all about?" Malcolm asked, skipping to keep up with her pace. "First my comp tells me I can't eat, then you show up, take my comp and confuse me more. What's going on?"

Suzi smiled. "Nothing bad . . . for you, anyway. Here, give me the keys and we'll get started. Strapped in? Good. Now, tell me, Malcolm, how many people do you think are in your same fix right now?"

"Gee, I don't know. I don't have any idea. I could ask comp. . . . " the thought trailed off.

"In fact, as of noon today, the total was 2,295,644. And, as of the end of this year, over five million people will have had your problem."

Five million people? The number was too big to think about. Was this real? Malcolm shook his head to clear his overloaded mind.

"Not everybody dies," Suzi continued, as she keyed in coordinates for their eventual destination. "Some pay the premium. Others are healthy enough to get through the starvation. But you wouldn't have made it, Malcolm. You're too old, and not nearly fat enough."

"So what can I do? I don't have the money . . . at least not now. And I can't afford to be without med insurance. You know what happens if I get taken to a hospital without it." They both did. But vivid pictures from the evening news flashed through Malcolm's mind nonetheless. Med thieves—theft of medical services was a crime, punished by "enforced contribution" to the organ bank. On the spot. Choice of organ up to the hospital. The lucky ones got off with eyes or tongues.

"It's simple, Malcolm. You'll follow your comp's instructions—to the letter! But think about this: everything causes cancers, right?" As she spoke, the car turned toward a large, nondescript warehouse-like building.

"Sure. That's common knowledge."

"But what if nothing caused cancers . . . nothing physical, that is. What if cancers were primarily mental illnesses?" Leaving Donkin to ponder her bombastic statement, Suzi manually steered the car into a warehouse portal.

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Inside, the "warehouse" became a wide central "park" surrounded by balcony offices. The offices were reached by a series of glass-enclosed elevators, giving the whole structure an old-fashioned look, like the old Peach Tree Plaza (before it was torn down).

Suzi took Malcolm's arm and rushed him to the elevator bank. "Not much time," she explained. After a short but dizzying climb (Donkin had always disliked elevators), they hurried down a wide balcony hall, passed by a combination of cowled and normally dressed people—each on their own urgent errand.

Pushing open a large door, Malcolm was led into what seemed to be a typical doctor's office, much to his relief. Suzi planted him in the waiting area, smiled, and called "Be right back . . . " over her shoulder, as she entered an inner office.

In a few minutes she returned, having shed her cloak for a nurse's uniform. "The doctor will see you now, Mr. Donkin," she announced with a smile. "Please, follow me."

"Why not," Donkin returned with a scowl. "That's all I've been doing the whole damn night." Even so, he followed her as he spoke, down a short hallway to another door. "And where's my comp? And who are you folks, anyway? And—"

Suzi turned with a frown. "Quiet, please," she said firmly. "You're not the only patient here." And, as she opened the door, "Dr. Harrous, Mr. Donkin."

Again things looked normal. A typical examining room (Something you get more used to as the years pile up, Donkin thought to himself), complete with scan apparatus and comp diagnosis probes, the standard seat/table, and —dominating the setting—Dr. Harrous. Tall, with a suggestion of strength, yet old, and—at the same time—happy, with a broad good humor that couldn't help but be contagious. "How do I know this?" Malcolm thought. "Have I seen this man before somewhere?"

"Of course you have," Dr. Harrous replied, answering Malcolm's unsaid question. "Think back . . . to when you watched teevee as a kid."

Teevee? That brought back a flood of memories from Donkin's childhood. . . . the time before comEnt. And among them, a face he recognized and connected. But the name . . . what was the name?

"Oh come on, Malcolm," Suzi interjected. "Don't you remember Marcus Welby?"

Of course he did, and now—with the name—his memories were as bright as . . . as a new penny (there's another old memory!). The strength of his recollections was unexpectedly strong. He felt tears welling in his eyes.

"Yes! I do remember. But why . . . why the disguise?"

"To get your attention and your trust—immediately," answered the doctor. "Now, to work. Nurse, set him up please."

Soon Malcolm was laden with probes and sensors, literally from head to foot. The tests, which consisted of images flashed before his eyes and other sensory inputs, began—and were over in less than ten minutes.

"That's it, Malcolm," Harrous announced as Suzi removed the sensors

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and probes. "Analysis will take about twenty minutes. While we're waiting, let's go back to the lounge and I'll finally tell you exactly what's happening, *and* how we're going to help you."

"Thanks, Dr. Welby . . . I mean . . ." Donkin was very confused.

"That's all right, call me Welby if you like. I chose the persona to make the process easier for you, after all." By now they had reached the waiting room again. "Sit down, Malcolm. It's all right."

Malcolm sat, blinking in confusion.

"First of all, our comp has contacted the Post Office. As of now, you're on sick leave, attached to us for care. In an hour you'll have your comp back. After that, you'll neither eat nor drink for a full week."

"But how . . . Suzi said . . . "

"No, you won't die. You will lose some weight, and that will probably do you some good—we'll know how much in a little while. We're going to put you under a form of hibernation, Malcolm. Do you know what that is?"

"Like the bears, you mean? But how—?"

"It's a long, long story but the short form is this: for the last decade, a growing number of doctors have decided to take our oath more seriously. We have decided not to stand by while the comps starve millions of people to death every year, in a society overflowing with food. You see the result around you, and in hundreds of other facilities."

"But what about the cancers? Aren't you cheating the med insurers? Are you saying the cancers aren't real?"

"Oh, they're real enough, and no, we don't cheat the med insurers. The facts are these, Malcolm. Of those 12,000 some odd cancers we're beaten to death with every year, only about 100 are real. Real cancers, that is. And research on them continues. The rest are stress-induced symptoms that have nothing to do with the real thing. But they do weaken us, and set us up for the real diseases. After all, we've eliminated almost every other bug, and people live so long these days. Think about your own case. How old are you this year?"

"Ninety-five," Malcolm replied with some pride.

"Ninety-five," Harrous/Welby echoed, "and you're by no means unique. I have to put on the Dr. Kildare persona for some of my patients. Anyway, let's not talk about cancers for a minute. Let's talk about stress."

"Stress? What about it? It's not like the old days. Everybody has a job and a paycheck, a home, credit . . . there shouldn't be much stress anymore."

"But there is, Malcolm. Our tests will probably show that you're under incredible stress, right now."

"Well who wouldn't be?" Malcolm bellowed. "First I get told I'll have to starve for a week, then all this mumbo jumbo . . . " he sank back in his chair, holding his head in his hands.

"Just my point," the doctor replied. "First there's the underlying fear of some wrong thing being discovered, as your comp records and analyzes every second of your life, the reality of being constantly watched, measured, scrutinized. Overchargers, med thieves . . . all products of this surveillance. That's how we found you, you know. By running a profile through the med-

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comp data base, ostensibly for a new product test.''

''But how else can it be?'' Malcolm mumbled through his hands. ''I remember. The world had gone crazy. No one could afford the med premiums. . . . ''

''No one can afford them now, Malcolm. They take 55 percent of your paycheck, and everyone else's, too. But we're going to change that, for you anyway.''

''What do you mean? How?''

''While you're under you'll get special instruction in stress-reducing activities and exercises, all tailored to your specific psych profile. And we'll try and change your attitude, so you don't feel so much like a secret agent in an enemy country any more.''

''Is that how I feel?'' As he asked the question, Malcolm realized the truth of the statement.

''Unfortunately, that's how everybody feels, to some extent.'' The doctor shook his head. ''But it can change, if you'll work with us. And now, Suzi's back with the results. . . . Let's see. Surprisingly good! You aren't a veteran, are you, Malcolm?''

''No, but my father was.'' A vision of the hollow-faced man, who disappeared from his life soon after he turned twelve, flashed in Malcolm's mind.

''Well, for some reason, you have a highly developed ability to deal with stress. Unusual. Miss Cooke, are the hyb facilities ready and calibrated?''

''Yes, doctor.''

The kindly Welby face turned again to Malcolm. ''It's decision time, I guess. We're going to give your comp back to you now. It thinks we're in the hospital you normally use. Your med insurance will be charged for this treatment—I told you we don't go around them. But it's your decision. Do you want what we've offered, or not?''

''And if I don't?''

''We'll try our best to help you using conventional techniques. But Suzi wasn't lying—you're not likely to make it. Or we'll give you food, but comp will know. From tomorrow on, you'll run the risk of becoming a med thief—and we can't help you.''

''Hobson's choice,'' muttered Donkin, wondering where that phrase had come from. He stood. ''All right, doc. I never missed your show as a kid, so I guess I can't go wrong with you now. Besides, Suzi is too pretty to walk away from.''

The blushing nurse reached behind his chair. There was the yellow box. As it was opened, Malcolm reached in and retrieved his comp. ''Treatment billed to your med account,'' it chattered, as if it had been with him all along. ''Do you verify?''

''Verify,'' Malcolm replied tightly, wondering what the rest of his life would be like. In a few minutes he was wheeled from the office on a gurney, away from the friendly Welby face, away from all of his past. Then, a darkened chamber, the mutter of techs, the surprise of something cold against his forehead and hands and, finally . . . darkness.

''Here's another one. Get Nelson.''

''Am I your servant, Schratt?'' Byner was irritated. This made four times today.

''You know what he said, you're

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closer to the door, and you're junior. So get going."

"Bitch," thought Byner as he hurried down the hall. "You'd never have found any if I hadn't designed the search routine." He reached Nelson's office and leaned in. "We've found another one, boss."

Looking up from his coffee, Nelson stared at the comptech. "How many does that make?"

"Let's see . . . four this afternoon . . . seven. Seven so far, and it's not even three yet."

"Tell Schratt to hold the record on screen. I'm coming to you. We have to talk."

Byner retreated with the news. He had hardly reached his desk as Nelson stepped into the half-lit room. "Schratt, full projection," he ordered.

Immediately, the record's image was projected to a point in space in the room's center, where all could see it. "This one's like the others," intoned Schratt. "Med premium declining, for the fourth straight quarter."

"We know that's impossible, don't we." Nelson was matter-of-fact.

"Theoretically, no," replied Byner, who had decided to get his two credits in early. "Improved diet, exercise, weight stabilization, stress reduction . . . a person could . . . "

"Could what, Byner?" Schratt didn't wait for Nelson's reply. "Could what? Could reverse a trend that's been the heart of this economy for the last thirty years? How many times have we seen this before? Never! I tell you there's scan fraud here! This guy, and the others like him, they've found a way to cheat their comps."

"Calm down, Schratt." Nelson soothed his senior comptech, who he knew was about ready for final meds anyway. "Calm down. Just because a phenomenon has never occurred before . . . that doesn't mean it's impossible. Just highly unlikely. After all, FEDMED insures fifty million people." Fifty million. The thought fascinated him. Twenty percent of the country.

"But how can it be," Schratt was almost sobbing. "How can it be? The agents build up every year . . . every second. You can't get them out! The premiums *must* go up."

"They didn't for this guy," Byner answered mildly. "And he's older than you, Schratt. Him and six others . . . as of now."

"Seven," whispered Nelson. "Hardly a trend, thank God. Still . . . Byner, have you checked data input—in detail?" He let the words hang in the air.

Schratt barked an answer. "No, he hasn't. I did it myself. I didn't trust *him*. No anomalies. No overcharges. No blank periods. No late premiums. No, no, NO!"

She's working herself up to a seizure, thought Nelson. "Anything remarkable at all, about any of these?"

"Yes, though Schratt won't buy it." Byner saw that he was gaining the upper hand, and moved to consolidate his position. This could mean a promotion. "All seven survived a week's starvation, due to premium tipover, within the last four years."

Schratt was yelling at the top of her voice. *"It doesn't mean anything!* I—"

"Please! Ms. Schratt!" Nelson held up his hands.

"I'm sorry . . . sorry. Excuse me. I

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mean . . . I went through it myself, just five years back. Millions do, every year. It doesn't mean a thing." But it had. She could still remember her feelings, starving in a world full of food, thirsty in a world of a thousand beverages. She had never really recovered.

"Still, it is something," Nelson mused. Tipover! A simple idea with unlimited potential. Stress was the key, of course. And stress could be measured, every time a comp took a voice print. As stress rose, the odds for one or more cancers became greater. So, tipover—the plateau a statistically significant fraction of policyholders reached every year, every day. No credit to cover the next premium increase and no way to avoid that increase. Starvation usually took care of about two-thirds of those affected. Their collected premiums became pure profit (less the interment rider, of course). As for the rest—if Schratt were an example, time was short for them as well. A thought struck him. "Are any of these people local to us?"

Byner answered, "Only the latest—Donkin, Malcolm. His apartment is only about 100 klicks from here. Why?"

Nelson turned to face them both. "We've got to be careful. This may be just what you say, Ms. Schratt—just a minor case of scan fraud. Or it could be a real problem. We can't present it unless we know for sure. To be wrong would finish us at the home office. Here's what we'll do: Byner and I will visit this Mr. Donkin—tonight, at his flat. In the meantime, Schratt, you stay here and keep scanning for more of these problems. Agreed?" Nelson expected no argument, and he got what he expected.

Donkin's flat was unpretentious, at best—a one-bedroom apartment on the 45th floor of a hundred-story building, set in a ring suburb near a major transit link. The elevator, like the lobby before it, exuded the slightly slick feeling that pervades metal that has been touched daily by thousands of people for a long time. "I'll be glad to get back to my place," thought Nelson with a shiver, though in truth his quarters were not greatly different. Byner, on the other hand, felt right at home.

No one answered their knock, but the door creaked open, and the strains of a kind of music neither had heard before beckoned the FEDMED techs inside. The room they entered was devoid of typical furniture. Instead, bright pillows were scattered about, partially covering a variety of carpets and rugs, which were strewn randomly over the floor. An old man—very thin and very bald—sat silently in the center of the room, his eyes closed, his legs folded upon each other, arms extended to the floor, palms out.

Nelson cleared his throat twice and got no response. "Mr. Donkin? . . . " he ventured.

"Shhh!" came the reply. And ten minutes later, "Who are you and what can I do for you?"

Nelson was relieved. During the time they'd waited, the old man hadn't moved a muscle. "Good evening, Mr. Donkin, I'm Durham Nelson from the Federal Medical Insurance Corporation, and this is my associate, Lester Byner. We're here . . . "

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"You're here because I'm still alive, and because my med premium's going down. I know. Well, I've been expecting you. What's the matter, aren't FEDMED's bugstops any good? I thought you'd be by last year."

"Since you know why we're here, perhaps you won't mind answering a few questions. For starters, have you always furnished your apartment this way?" Nelson was intrigued. He had never seen anything like Donkin's rooms in his life.

"No, young man, I haven't. Only since my starvation. You'll have seen that on my records, of course."

"Yeah," interjected an excited Byner. "And since then, your med premium's gone down, four quarters in a row! Any ideas why? Does this . . . this . . . "

"It's called yoga, and it certainly does have a lot to do with it," Donkin answered quietly. "What you saw when you arrived was part of a system of mental and physical exercises I practice every day. It has helped to cleanse my mind of stress. Less stress, less med premium. It is as simple as that."

Nelson was amazed. Somehow, the old man knew. "Mr. Donkin, we have records of at least six other—"

"Nine, boss," Byner muttered. "We found three more before we left."

"Okay, *nine* more . . . thank you, Mr. Byner. Look, Donkin, we've found a few others with declining med insurance profiles, like yours. Do you know of them? Have they all taken up yogie or yoga or whatever you call it as well?"

The old man sighed. "First off, there's hundreds of us, maybe thousands by now. And no, we're not all yogis. What we do to relieve tension depends on our personal profiles. One man I know knits. Another paints. Another collects stamps. One woman lifts weights. It varies from person to person."

"Did you say hundreds? Thousands? Is this some sort of conspiracy?" Although the room was cool, beads of sweat appeared on Nelson's forehead. Byner backed against the wall.

"Calm down, both of you," the old man laughed. "It's nothing but your own med algorithms. Check 'em out. The irreversible buildup which leads to tipover assumes a constant or rising level of stress. Not an odd thing in the world we've made. Drastically lower stress, reduce consumption, get a little exercise . . . does that sound like the recipe for a conspiracy? Besides, I might be wrong about the numbers. Give an old man a break, will ya?"

Byner had been nodding his head. "He's right boss. My modeling shows it can be done. But not by many. Look at this guy! How many people can do this yogie stuff? We've proved the whole phenomenon is just a statistical fluke, just like you said."

Nelson looked relieved, and was. "You're right, Byner. And thanks for your time, Mr. Donkin. I hope you appreciate that we made this visit for your own good."

"Of course, boys, of course! Can't be too careful," Donkin babbled happily as he led the FEDMED techs to the door.

"Whew," he breathed as they finally entered the elevator at the end of the hall. They had almost made him late. Rushing now, he opened his closet and

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slipped his comp into the yellow box inside. Then, donning the robe and cowl he'd been given two years ago, he dashed from his flat to the elevator. Luckily, his store assignment was close. As he rode to the parking fields, he calculated the effect he and his growing army of co-workers would begin to have on FEDMED computers *next* year.

As Dr. Harrous had said in their last meeting, "They'll never believe it until it's too late. They're too cautious. And, within two or three years, a lot of their techs will be on *our* side. From now on, it's just a matter of geometric progression. We can't lose." The thought would keep him warm as he rode the cold jitney through the night. ■

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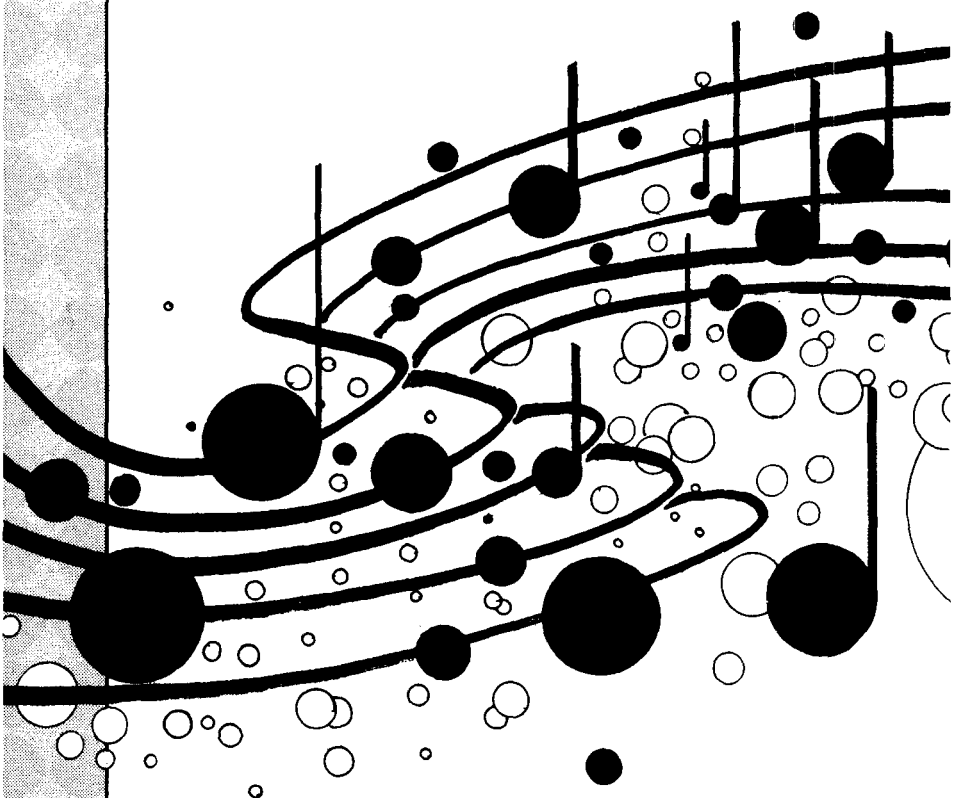

BEYOND THE WHISTLE TEST

Greg Egan

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Computer "virus" scares have made some people glad they don't use computers. But really, of course, *everybody* does. . . .

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Michael Underwood, creative music consultant to The Inspiration Factory, couldn't help sneaking a glance at his watch. There was work to be done for the Hypersoft campaign that had to be finished that day, and the afternoon was slipping away. He'd been talking to John Halbright for twenty minutes, and he still didn't know why the head of Applied Neural Mapping seemed to think he had invented the greatest gift to advertising since the Treasury Department had agreed to sell space for reflection holograms on the ten-dollar bill.

Halbright noticed the gesture, steeled himself, and began again. "You understand that we've identified the neural pathways involved in the processing of music?"

Underwood didn't like the idea, but he nodded. "With PET scans, and so on. But when you say '*the* neural pathways' . . . surely everyone's brain is different, or how else could people have different musical tastes? Surely it all depends on culture and education, and ultimately on every single individual musical experience—"

"Yes, of course it does! I'm not denying that for a moment. All kinds of factors—most of them environmental, a few genetic—have a profound effect on the structures involved. We've scanned over two thousand volunteers, with an immense variety of musical preferences, and we've found idiosyncratic subtleties in their pathways that leave the differences in fingerprints or retinal patterns for dead. But in spite of that, our software has still been able to determine the *common features*—the properties shared by the relevant neural networks of *all* of our subjects, regardless of the fine details. I mean, think of the circulatory system; no two people are alike down to the level of capillaries, but on the scale of the major veins and arteries, everyone is the same, and everyone's blood supply functions pretty much identically. Of course, abstracting the behavior of a system of neurons is a lot more complex than that—it's not a matter of the physical size of anything, it's all to do with the topology—but it can still be done."

Underwood nodded again, still unhappy, but deferring to the expert.

"*Now,* having created a well-defined mathematical model of the generic listener, we're able to determine its response to any pattern of input. Any sequence of sounds. *Any piece of music.* Do you see?"

"Yes, but if all it does is what every listener does, what's the use of it? You could as easily listen to the sounds yourself, and see how you react."

Halbright shook his head and said, patiently, "Two things. Firstly, it's free of the complications of individual taste. Experimenting on the computer model is a bit like experimenting on the two thousand plus volunteers upon whom it was based, and then looking at the average response of that entire group—only it's a lot quicker, easier, and cheaper. Secondly, because the model is so precisely defined, we needn't just play it tunes at random and see what the effects are. We can use various mathematical techniques to work backwards, to *design* music specifically to affect the model in a chosen way."

Underwood frowned. "The first application, I can understand. If we wanted

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to test a melody for a jingle, we could play it to the computer, and if the computer liked it, you claim everyone in the world would like it, too. But—''

''Hold on! No. We don't claim that at all. The model doesn't 'like' or 'dislike' anything. Even if we could characterize those responses, how could it? All of its properties are shared by people with wildly different, perhaps even mutually exclusive, musical tastes. But what the model *can* do is *remember* music. We haven't limited it to the structures responsible for real-time auditory processing; all the machinery of short-term and long-term auditory memory is included. So if a melody elicits a strong, persistent response in the model, then we can predict that in a real listener, the same thing will happen: the music will be memorable. We've tested this out in a dozen experiments, and there's no doubt at all that it holds true.''

''And what about this music you've had the computer create? What's the use of that? You say the computer has no opinion of it either way; what do people think?''

Halbright grinned. ''Some people love it. Some people despise it. But, like it or loathe it, *they can't get it out of their heads*. After a single hearing, we have a *one hundred percent* success rate for subjects recalling our optimized melodies, long after they've forgotten control tunes.''

Underwood laughed. ''This is beginning to remind me of The Old Grey Whistle Test.''

''The *what?*''

''The Old Grey Whistle Test!''

Halbright shook his head, perplexed. ''I've never heard of it.''

''Certain record companies in the sixties—so the story goes—used to decide whether or not to release a song by roping in the building's janitor—usually an old man—and making *him* listen to it. If even this old fuddy-duddy, who presumably hated rock and roll, could whistle the melody after hearing it once, the song was worth putting on disk. If not, forget it. Hence 'The Old Grey Whistle Test.' There was even a rock music show on British TV named after it.''

Halbright was annoyed by the frivolous comparison, but hid his reaction as well as he could. Underwood was the first advertising executive who'd actually agreed to talk to him, and if the man wanted to tell any number of pointless anecdotes about the 1960s, he'd sit through them all with a smile on his face.

''The important thing,'' he said earnestly, ''is that we've eliminated the need for that kind of trial and error. We've gone beyond mere *testing*. It's like . . . '' He struggled to think of a dignified metaphor. ''Pharmacology used to be all luck, or at best educated guesswork: they'd test a few thousand likely substances on animal models, and see which of them, if any, did the trick. Today, people sit down with computers and *design* the molecule that's best for the job. Well, that's what we've done for music.''

Underwood nodded. ''I think I understand what you're getting at—but what I'd really like is to hear some of the results.''

Halbright insisted that he sign a twenty-page nondisclosure agreement, before letting him listen to a sample

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tune. "None of this music has been published in any form, so we have to be extremely careful to protect our rights."

Despite all the build-up, Underwood was not expecting much, so he was neither surprised nor disappointed by the inane little melody in four-four time that Halbright's console finally played for them. The timbre was authentic grand piano—as fine an instrument as ever was sampled and sold on a fifteen-cent ROM—but that only made the music's utter banality all the more painfully obvious.

Underwood made some noncommittal remarks, then finally escaped from the office by pleading a pressing appointment, and promising to consult with his colleagues and get in touch again as soon as possible. Halbright was unfazed by this euphemistic brush-off, and seemed as happy and confident when the two men parted as he had been when they met.

As he walked through the dazzling sunshine across Bentley Technology Park's lavishly reticulated lawns, Underwood caught himself whistling the tune, and angrily stopped. The piece was ranked *one-hundred-and-eightieth*, out of the two hundred that ANM had generated so far, but he had to admit that it stuck in his mind as tenaciously as any other scrap of bubble-gum music he had come across—and in his line of work, there had been many. Somehow, though, it was more offensive than most: appallingly simple, insultingly bland, music unfit for a nursery rhyme, lacking a single redeeming charm. He had no doubt that any composer who had stumbled upon it in the past would have taken a stiff drink and gone to bed, in the hope of waking up with this aberration mercifully forgotten.

As he drove north into the city, traffic noise—which usually drove him mad—could not even begin to compete with his memory of the tune, and as he ascended to the thirtieth-storey offices of The Inspiration Factory, the horrendous pap in the elevator—a synthetic orchestral version of the Sex Pistols's "Anarchy in the UK"—was barely noticeable.

He spent the rest of the afternoon, and much of the evening, selecting music for the Hypersoft commercial. This meant J. S. Bach—the clients had insisted—and since most of the best-known works had already been used within recent memory, he had to search the music library for several hours before he found an unexploited passage with just the right mood for an up-market toilet paper.

Bach, he was pleased to note, soon drove Halbright's obnoxious musical parasite right out of his head.

By the time he had located four alternatives, it was after ten o'clock. With one keystroke, he sent a memo listing his suggestions to all the people working on the Hypersoft campaign, then he switched off his console with a weary sigh, and headed home.

Magda was in bed, but not asleep. Underwood hit a selection on the freezer/microwave on his way past, then walked into the bedroom and sat on the bed beside her.

"Hi."

She frowned. "You look sick."

He laughed. "And how was *your* day?"

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"I've nearly finished."

"See? I told you sound tracks weren't so hard."

"The director still has to hear it. She might hate it."

"Crap. You talked it all over with her months ago. She's heard all the individual themes."

"I've added some new ones."

"She'll love it. All of it." He kissed her, then the microwave beeped.

After eating and showering, he climbed into bed. Magda had fallen asleep. He slipped on a pair of infrared headphones, touched a few keys on the bed's entertainment unit, then lay back and waited for the music to begin.

Most of his favorite classical works had long since been lost to him—ruined by the kind of association it was his job to forge—but his tastes were eclectic, and there were gems, as yet intact, to be found elsewhere.

This Mortal Coil's "Song of the Siren" flowed into his skull like liquid silver, banishing the room, banishing his body, banishing all of the day's indignities. He seemed to float in vibrant darkness, disembodied, his soul resonating with every note, the singer's unbearably sweet voice engulfing him in cool, translucent, purifying flames.

This nightly ritual meant far more to him than the pleasure of the music itself. He craved reassurance that, however much his job required him to treat music as just one more tool of marketing psychology, a part of him was still able to value it for its own sake. A part of him could still be moved.

When the song ended, he lay in the dark, listening to Magda's slow breathing, thinking: *Bach for toilet paper. Beethoven for insurance. Mozart for ice cream.* It was obscene, and there was no point pretending that it wasn't. He had heard the standard argument many times, he had used it himself in his own defense: All the great composers had sold themselves, had written for the sake of money and position and prestige, none had been ascetics or saints—but ultimately, he believed, this justified nothing. However venal the composer might have been, something was lost from people's enjoyment of *the work itself* when it became inextricably linked in their minds with some consumer product, or company name. And yes, a TV commercial might bring a thirty-second version of a masterpiece to millions of people who might otherwise have never heard it at all—but seeing *that* as worthwhile struck Underwood as patronizing in the extreme. If most people chose not to seek out classical music, that was their right; the claim that advertising was magnanimously "bringing culture to the masses" would have been ludicrous and offensive, even if it were more than a cynical *post facto* excuse.

An idea that had been growing in the back of his mind all afternoon suddenly leapt into focus: perhaps John Halbright's revolting little tunes were the answer. Sure, they were unspeakably awful, but what did that matter? Composers had been cranking out vile, but catchy, music for the advertising industry for decades; if taking *that* to its logical conclusion could halt the current fashion for looting the classics, it could only be a good thing. Sure, it meant polluting people's minds with musical effluent, tailored to be remembered

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however much it was disliked—but that was nothing new, and it *had to be* better than eventually devaluing every great work of the last three centuries.

Underwood fell asleep with ANM tune #180 running through his head, but in spite of that he felt happier than he had in years. At last, he thought, he was going to do his job the way it should have been done from the start; at last, his clients were going to get the music they deserved.

As Magda dressed, she whistled tune #180. Underwood stared at her. "Where did you hear that?"

She stopped and frowned, puzzled. "I don't know. Hang on . . . you were whistling it last night, weren't you? In the shower, while I was drifting off to sleep?"

He couldn't remember doing so, but obviously he had. "Well, try to forget it, will you? I signed a sheaf of paper which said I'd burn in hell if I repeated it to anyone."

She whistled a few more bars, listening critically for the first time, then grimaced with distaste. "I'm not surprised. If *I'd* written it, I wouldn't want anyone else to hear it either. My lips are sealed, I promise."

Ten minutes later, she was doing it again.

Driving into town, Underwood began to have second thoughts. It had reached the stage where the tune was playing over and over in his skull, without the briefest respite—*how could he wish the same fate upon hundreds of thousands of people?*—but he told himself it was the context, not the music itself, that was responsible. He had high hopes for ANM's product, so it was only reasonable that he be preoccupied with the one example that he'd heard so far.

After driving straight through a red light and almost being wiped out by a petrol tanker, he pulled up at the side of the road, shaken. He could hardly put the blame for his brush with death on Halbright's music; it was his own state of indecision that had distracted him. The thing to do was to bury his qualms and strengthen his resolve. Noble aspirations about saving the classics from further rape seemed secondary now; if *he* didn't make a deal with Halbright, someone else would. Someone else would capture all the lucrative accounts which the ANM tunes, if skillfully deployed, would eventually attract; he owed it to the company to get involved, or the competition would bury them. One way or another, the tunes would all end up being heard by the public; what better way to make sure that this breakthrough was used responsibly, than to involve himself with it as closely as he could?

He squeezed his way back into the traffic.

As Underwood had anticipated, even after he'd convinced The Inspiration Factory's partners that he'd found a potential gold mine, everything progressed at a snail's pace. It took several months of negotiations just to arrange a contract with Applied Neural Mapping which would allow certain of the agency staff to listen to a few of the available tunes, and play them to selected clients for approval. Ideally, Halbright explained, the melodies should be used in order of increasing potency, with long intervals

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between release. "There's a masking effect; if we used the best tunes first, we'd be making people less receptive to the others."

The first campaign to use an ANM tune was for a local soft drink manufacturer, Millworth and Hobbs, who were struggling to compete with the international giants and their megabuck celebrity endorsements. Tune #164 was arranged for two fiddles, harmonica, and drum machine, and decorated with numerous riffs which went a small way towards disguising its naked awfulness. A singer who could reproduce the media's idea of the state's typical rural accent was found, and he heartily sang:

There's only one drink
Made here in the sun:
Millworth and Hobbs!
There's only one drink
For our own brand of fun:
Millworth and Hobbs!
They're the drinks that sparkle with sunshine!
One sip and you'll never look back!
It's the drink for the family
The old and the young:
Millworth and Hobbs!

The campaign began with radio, predominantly the city's top-rated FM rock station. The results were phenomenal. Preliminary phone polls showed an unprecedented rise in the level of product awareness, and within weeks this could be seen translated into sales, which increased by an astonishing *fifty-three percent* in little more than a month. The company—which had been contemplating retrenchments—had to introduce a night shift to keep up with demand. The TV phase was shelved; it would have been money down the drain, when a new plant would have to be built before production could rise any further.

The clients were over the moon. Underwood was given a substantial raise. ANM were paid a bonus, stipulated in the contract for any tune which boosted sales by more than twenty-five percent.

Underwood heard people whistling #164 everywhere—at work, in the streets, in shops—but he knew he was biased, he knew he would notice it more readily than any other tunes he might hear. Magda whistled it, unconsciously, and he gave up telling her when she was doing it. He whistled it himself, and fell asleep at night hearing it; listening to other music drove it away, but in silence it soon came back—sometimes alone, but usually dragging the obnoxious lyrics with it. It astonished him that people weren't smashing bottles of Millworth and Hobbs in protest, weren't storming the soft drink company—or its advertising agency—weren't calling for *someone's* head. But they weren't. There was no public outcry. People were *used* to having music they hated pumped into their brains, and however radical and effective, Halbright's method of composition, his music belonged to an established, and accepted, tradition.

The campaign's remarkable success was noted, briefly, in the local press, and commented on extensively in the advertising trade magazines, but the deal with ANM remained a secret. Underwood doubted that this would last forever, and felt sure that once all the details were out, some sections of the media would label the whole affair as "brainwashing," but the fact remained

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that they'd simply done *well* what everyone in the business had been doing for years.

Other campaigns soon followed. There was no need to encourage clients to give up the classics for the ANM style; they had seen the effect on Millworth and Hobbs, and demanded to be let onto the bandwagon. Underwood would have been more than just disappointed if the trend had not caught on; he would have been unable to do his job. The ANM tunes had virtually commandeered his musical sensibilities; he could still *listen* to other music, but he had trouble recalling even the most memorable works unaided (had anyone asked him to whistle a few bars from "The Hall of the Mountain King" or "The Ride of the Valkyries," he would not have been able to oblige), and the task of selecting an appropriate classical piece for a given commercial would have taken him ten times as long as it once had.

This affliction, he told himself, could not last. Clearly, other people were not affected as badly as he was. Magda had been commissioned to compose the sound track for a mini-series, and she went ahead and did the job with no apparent difficulty; Underwood could not have composed anything if his life had depended on it.

As more and more potent tunes were released, he grew much worse—yet he couldn't bring himself to tell anyone that he felt like he was being buried under layer after layer of musical excrement. After lapses of concentration led to a few near misses in his car, he started taking the bus to work. The possibility that other people might be risking their lives horrified him, but he dismissed it as ludicrous. Everyone he saw around him seemed to be functioning normally, which proved that he was a special case—and wasn't that to be expected, when he was exposed to the tunes more frequently than almost anyone else? In fact, there *had* been a rise in traffic accidents in the past few months—stories were run in the press and on TV, politicians and police made their usual calls for various countermeasures—but this was hardly the first time there'd been a statistical fluctuation in the road toll.

Nobody seemed to notice his deterioration. Although he was paid more than ever, his job had become a simple matter of deciding which ANM tunes were to be used for which products, and his choices didn't seem to make much difference; all the campaigns were wildly successful, he could have made the allocations by throwing dice. Magda was wrapped up in her own work, and he had no trouble with their brief exchanges, nor with the kind of conversation that took place at the dinners and cocktail parties they attended.

One morning, he found he could no longer read the newspaper—because tune #87 was pulsing along in his head, in the form of a revolting jingle about air freshener that kept the printed words in front of him from making any sense—but he told himself that he was merely tired, and anyway, he didn't *need* to read the paper. He could still put on his clothes, he could still knot his tie and tie his shoelaces, he could still kiss Magda goodbye and walk to the bus stop—in short, he could do everything that was required of him.

Each night, before sleeping, came a brief respite: he would listen to a piece

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from his private collection, and emerge from mental quicksand into comparative lucidity. The effect lingered for a few minutes after the music stopped, and in these windows of clarity he made all kinds of plans: He would quit his job. He would go to Halbright, explain the terrible side effects, and beg him to devise a cure. He would go to the clients and let them know what had been kept from them. He would go to the press and tell them everything.

It was conceivable that he *was* the only person crippled by the ANM music—but when he was lucid, this struck him as unlikely. What if some small proportion of the population shared his susceptibility? It would be far worse for the others; they wouldn't even know what was happening, they would probably think they were going insane. That he was coping at all, himself, was a miracle—what about people who needed to concentrate, whose jobs depended on it? Whose lives depended on it?

At which point, the latest, most powerful jingle would begin to echo in his head, cutting off all such difficult and complex trains of thought.

One evening, Underwood came home and switched on the TV news. Pictures and the spoken word could still penetrate his stupefaction, if there was enough color and movement, and the leading item of the bulletin had plenty of both. Two jets had collided at the airport. Both had been about to take off; evidently one pilot had ignored or misinterpreted the control tower's instructions. Both planes had caught fire. Over four hundred people were dead.

Underwood didn't really want to know. It was tragic, of course, but his sympathy wouldn't bring anyone back to life. He rose to switch off the slow-motion replay of the impact—the airport had recently installed video cameras at strategic points on all runways, paid for by a national TV network—when the pilot's last words were heard in voice over:

The simple things in life are best
That's what my Grandpa said
Like sunrise o'er a golden field
And Grandma's home-baked bread
Though times have changed since then, I know
His words they still ring true
So Western's bread's the one for me
And it's the one for you

Underwood fell to his knees, shaking his head. It wasn't *possible*. An advertising jingle couldn't kill four hundred people.

Flames billowed on the screen, some technical fault rendering them a strange, unnatural hue. A man dived from an exit, clothes and hair on fire— Underwood thought: *he looks just like a movie stuntman*—screaming in an artificial baritone from the slowed-down tape.

He couldn't be held responsible—the pilot must have *known* she was impaired, she should have grounded herself voluntarily! But he knew that was nonsense; she would have dismissed the inane distraction blossoming in her head as no more dangerous than any of the dozens of other scraps of musical garbage which competed for her attention every day; she would have assumed, from past experience, that a little mental discipline would push this one, too, into

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the background, as soon as she really needed to regain her concentration.

He jumped to his feet, finally galvanized into action. It all had to stop, *now*. All commercials with ANM tunes had to be pulled off the air, immediately, and the public had to be warned, had to be told how to identify the symptoms so they could take precautions and stay out of harm. Perhaps he would end up in prison—or perhaps he would be lynched—but this was no time to think about that, he had to put an end to the deaths. How many others had there been? Traffic accidents, industrial accidents—there was no way of knowing how many recent fatal human errors had in fact had their roots in Halbright's music.

Magda was out, working late with a team of sound editors to meet a deadline for a tax concession. Who should he ring first? The papers, the TV stations? The police? Who would be most likely to listen, to understand, to set things in motion? He struggled to concentrate; the pilot's song was growing louder in his head, threatening to blot out everything else; her off-key crooning was even more insidious than the original, professional version—a grotesquely successful chance mutation.

Only Halbright himself would know enough of the truth to believe him at once, and as the creator of the music, he could spread word of the danger with some kind of credibility—not a lot, perhaps, but more than Underwood would have.

He picked up the phone, and tried to recall Halbright's home number. *The simple things in life are best / That's what my Grandpa said*. He couldn't. No matter; he found it in the address book by the phone. He stared at it, repeated it a few times, then started punching keys. *Like sunrise o'er a golden field / And Grandma's home-baked bread.* Half-way through, he stopped; he'd already forgotten the last few digits.

He placed the phone on the page, so that he could see both the keypad and the written number at the same time. *And Grandma's home-baked bread.* He began again, but when he came to the end of the number, the phone remained silent—he'd missed a digit along the way. *Like sunrise o'er a golden field / And Grandma's home-baked bread.* Sweat was pouring down his face; this was the end: complete dysfunction, insanity. *Like sunrise o'er a golden field / And Grandma's home-baked bread.* He screamed at the mocking voice to shut up, but his rage only seemed to incite it.

He crossed the living room to his CD player. He wasn't beaten yet. There had to be something that could clear his head, just long enough for him to make the call. He found the disk with "Song of the Siren," inserted it, and managed to select the right track. But the angelic, ethereal voice that had once moved him to rapture couldn't even begin to drive out the dead pilot's awful drone. He turned up the volume until the speakers shook, but the song remained remote and ineffectual. The track came to an end.

The phone rang, and he staggered over to it. It was Halbright, who asked nervously, "Did you see the news? What are we going to do?"

Underwood screamed, "Ring the TV stations! Ring the papers!"

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"*Me?* I'm no PR expert; I was going to ask you—" Halbright continued speaking, but his words made no sense to Underwood, who put down the phone and grabbed his head, moaning. The pilot's song had begun to invade his other senses. It had a strong stench of something sweet and rotten, and a sugary, fermented taste to match. He *felt it,* too; a thick, lukewarm, syrupy presence, flowing over his skin. *Like sunrise o'er a golden field / And Grandma's home-baked bread.* He cried out and waved his arms, as if trying to shake himself clean, and then the jingle, at last, appeared to him: a dark, viscous fluid which filled the room to shoulder height and flowed around him, encircling him in a sticky whirlpool. He screamed, and struggled to escape, but then the sweetly stinking black tide reared up and engulfed him completely.

When Magda found him lying by the phone, his eyes were open, but sightless, and all he could do was hum.

Underwood awoke—nauseous, aching all over, with a terrible throbbing behind his eyes, and a peculiar tightness in his scalp—and yet, without understanding why, he felt extraordinarily calm and happy.

Magda and Halbright stood by the bed. Magda stared at him anxiously, then gave what she hoped was a reassuring smile, and took hold of his hand.

His mouth was dry. "What's going on?"

She said, "Michael . . . you've been unconscious for nearly two weeks. I gave them permission to operate. Dr. Halbright said it was your only chance. And it's worked—hasn't it?"

"Operate?"

Halbright cleared his throat, then spoke, looking straight at him. "We did some scans while you were unconscious. You have . . . certain atypical structures in the higher levels of the auditory pathways, which don't quite conform to our standard model. I've run some simulations, and several of our tunes, when processed by your kind of circuitry, produce exponentially increasing responses—eventually limited by physiological constraints, but still strong enough to be virtually self-perpetuating—and strong enough to affect other parts of the brain. . . . a bit like a massive, never-ending epileptic fit."

Underwood stared at him. "And the operation?" He reached up and touched his head. It was shaven and partly bandaged, and he suddenly realized *why,* in spite of everything, he felt an undercurrent of blissful relief: for the first time in what seemed like forever, there was no ANM music playing in his skull.

Halbright said, "They cut the pathway at a few critical points. It was the only way. You would have been comatose for the rest of your life. There are ten others, just like you were, awaiting surgery right now."

Underwood suddenly remembered the plane crash, and his tranquility vanished. "So, that pilot was the same as me? She didn't fit your standard model, either. Who *were* those two thousand volunteers, anyway? Two thousand medical students? No, there wouldn't be that many in the whole state, you must have roped in some veterinary science and dentistry students as well, maybe even a few biochemists! What a broad cross-section *that* must have

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been!" He started shaking, sick with guilt and fear. "What's going to happen to us? Are we going to prison?"

Halbright looked away and said angrily, "We didn't break any laws."

The last track of the last disk came to an end.

The effect had been obvious from the very beginning, but Underwood had played his entire collection, ten hours a day for the past fortnight, to eliminate any doubts. To him, the disks now contained sequences of completely arbitrary sounds; he perceived each note in isolation from everything that had preceded it. For him, there was no longer any such thing as music.

Halbright had been right, of course, there was nothing they could be charged with. A number of civil actions were pending; the lawyers expected to settle out of court. Both men had received death threats, but the police had agreed to provide protection.

Underwood walked over to the window and looked out; the unmarked car was in the usual position. He took off his headphones, and sat in the dark for a while. ■

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futures

Matthew J. Costello

When I visited the set of James Cameron's film, *The Abyss*—nobody seemed too concerned about the competition, namely MGM-UA's *Leviathan* and Carolco's *DeepStar Six*. Now, with *Deepstar* released on video (from International Video Entertainment Inc.) and *Leviathan* already out, more people will be able to see why.

First, neither film troubled themselves with originality. *Leviathan*, starring Peter Weller and Richard Crenna, was *Alien* underwater, with a few twists so that it wasn't just endless mimicking of Ridley Scott's SF shocker. In *Leviathan*, a deep ocean mining habitat — Shack 7—discovers an unreported Russian wreck. When they explore it, they find evidence of some catastrophe that left the crew dead.

But who sunk the ship, and why?

They also find some vodka, which turns out to be material created for some kind of genetic experiment. When one of the American crew—a horny, affable Daniel Stern—unwittingly drinks it, well the rest is easy to guess. Stern and the other victims begin mutating, running through a gamut of hungry fish stages, until the remaining members of Leviathan have to program Shack 7 to self-destruct while they perform an incredible return to the surface.

Of course, all pretension to any scientific logic has also been jettisoned with any desire to create something new. *Leviathan* is laughably derivative.

Yet, I recommend that you rent the video. Because, despite everything I've said, it's fun. All the tricks it borrows and steals, the dripping water in the narrow corridors, the programmed countdown to destruction, the creature mutating and attacking the dwindling crew—it all works, with the same kind of visceral logic of a roller coaster. You may have gone on the ride before, but it's still fun.

DeepStar Six, on the other hand, after a lukewarm reception by critics and the box office, is, on the small screen at least, an even more enjoyable film. It mixes up its stories—of a monster buried in some deep ocean cave, and the race against time as DeepStar Six runs out of air—with a sure hand. Sean Cunningham, director of *House* and *Friday the 13th*, moves the action along at a terrific pace.

In this case, the ocean habitat is supposed to arm a secret navy missile base on the ocean floor. Many times I couldn't hear what the harried ocean workers were saying. But the images were the message, in this case, the isolation and terror in fighting an underwater boogeything at the bottom of the ocean.
tom of the ocean.

DeepStar Six is also notable for having the ultimate archetypal character for a film of this type—pardon my language—the asshole. We all know the character—boorish, lecherous, dressed in a sloppy T-shirt. This is the character nobody identifies with. It's also usually

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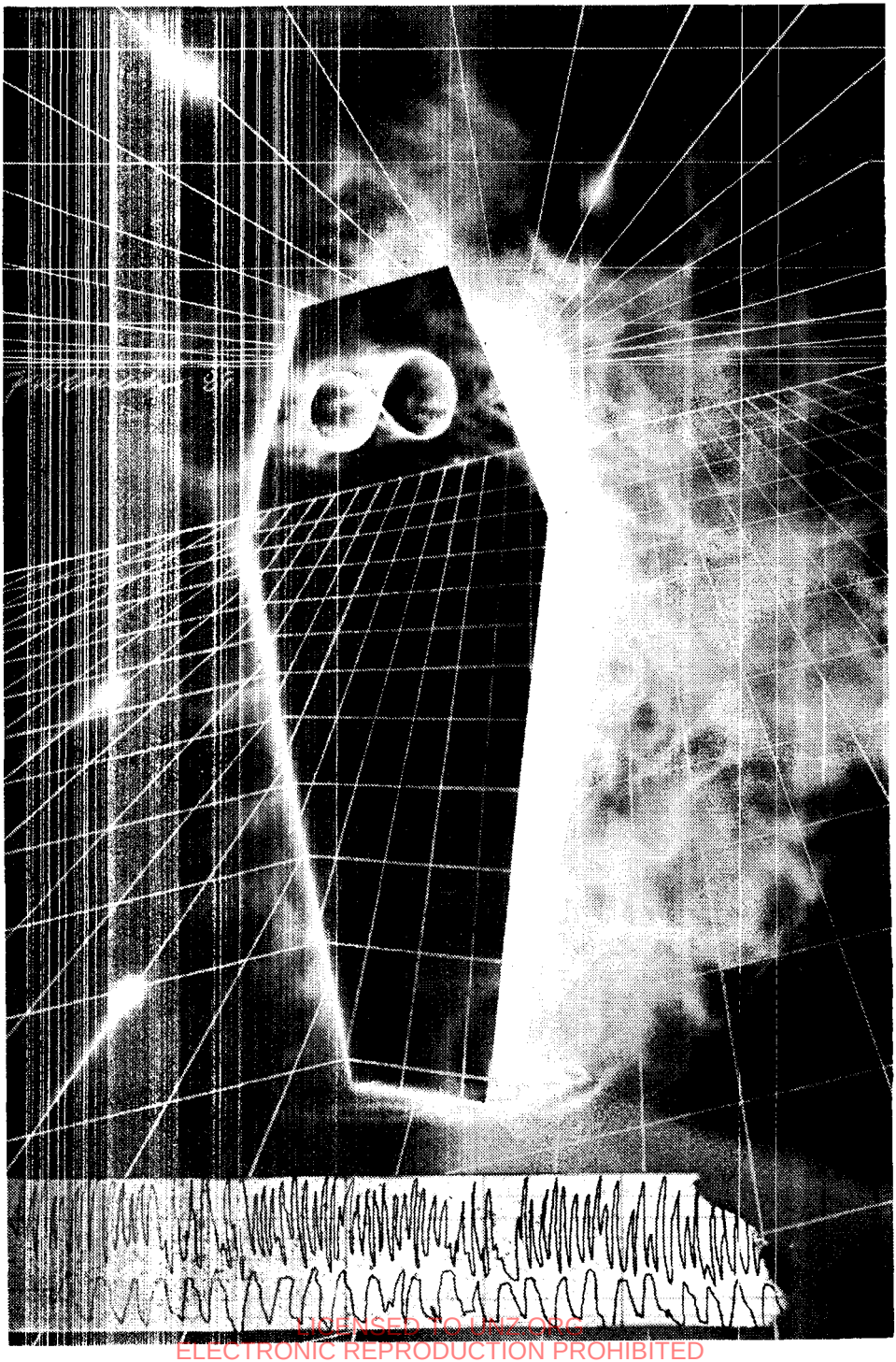

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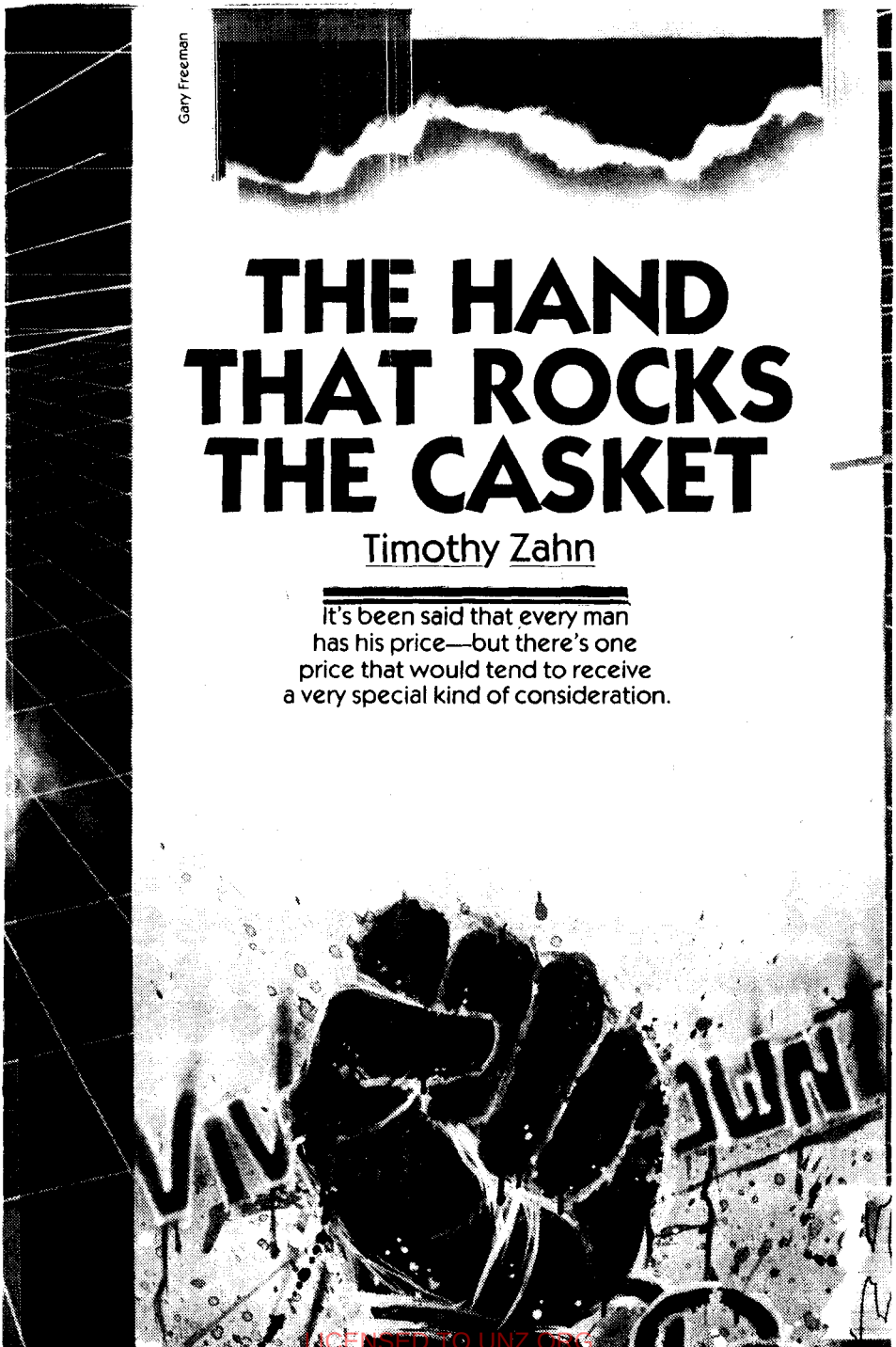

THE HAND THAT ROCKS THE CASKET

Timothy Zahn

It's been said that every man has his price—but there's one price that would tend to receive a very special kind of consideration.

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The air was dry but comfortably warm as Adrian Sommer stepped out the door of the unmarked plane and started down the steps, his two companions close behind him. The warmth was a distinct and welcome change from the 747's overenthusiastic air-conditioning, an even more welcome change from the January blizzards taking place five thousand-odd miles to the north. It was, he decided tiredly, precisely the right time to vacation in South America.

Some day he would have to try it. A vacation might be nice.

He'd asked that the reception committee be kept small, and for a wonder, the Chilean government had taken him at his word. The man in military dress uniform waiting at the foot of the stairway stood there alone, with only a single stretch limousine waiting a discreet distance behind him on the tarmac. Such willing cooperation was a good sign; Sommer could only hope it would continue.

"Welcome, Dr. Sommer," the man awaiting him smiled as Sommer reached the tarmac. The other's English held just the slightest trace of an accent, one composed of what seemed to be equal parts Spanish and British. It was a combination Sommer hadn't run into before. "I am General Miguel Diaz, minister of the interior," the other continued. "On behalf of General José Santos and the Chilean government and people, allow me to welcome you to our country. It is indeed an honor to have one of the co-inventors of the Soulminder visit our humble country."

"It's an honor to be here," Sommer told him as they shook hands. "My colleague, Dr. Sands, asked me to thank you personally for your invitation to her, and to send her regrets at being unable to accept."

"I understand fully," Diaz assured him. "The day-to-day management of your Soulminder empire must leave Dr. Sands very little time for traveling."

"It certainly does," Sommer agreed. "May I introduce my staff: this is Mr. Samuel Alvarez, my technical adviser."

"Señor Alvarez," Diaz nodded, offering his hand as Alvarez stepped eagerly past Sommer to take it. "If I may say so, you look very Chilean to me."

"You have a good eye," Alvarez said, smiling with a twenty-five-year-old's standard youthful enthusiasm. "My parents came to the United States from Santiago in '71, just after Salvador Allende took office. This has been my first chance to see their land—I'm very much looking forward to it."

"Your interest does our country great honor," Diaz smiled. "Perhaps you'll have time to take a proper tour; if so, the resources of my office are at your complete disposal."

"I'll look forward to it," Alvarez said.

"And this," Sommer said, gesturing to his other side, "is Mr. Frank Compton."

"General," Compton nodded, offering his hand.

For just a second Diaz's eyes narrowed. Then his face smoothed out again, and he took the profferred hand. "Señor Compton," he nodded. "The same Frank Compton, I presume, who oversees security for all of Soulminder?"

"You're well informed, General,"

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Sommer commented, trying to read the other's face.

"I'm always interested in men of outstanding abilities," Diaz said, his eyes still on Compton. "To handle security so successfully for so important a corporation as Soulminder is a great achievement indeed."

"It's not that hard," Compton said with easy modesty. "The secret's in finding the right people to do all the real work."

Diaz favored him with a slightly stiff smile. "You're too modest." He looked back at Sommer, eyebrows raised slightly. "There are no others, Doctor?"

"None who'll be coming with us into the city," Sommer told him. A true statement, but misleading: the rest of Compton's twenty-man security team was, in fact, already in Santiago, having quietly infiltrated the country as tourists and businessmen over the past two weeks. Members of the team would be moving with them from now on, an invisible defense perimeter augmenting whatever security the Chileans themselves provided. "And speaking of the city . . . ?" he added, surreptitiously stretching his shoulder muscles.

"Yes, of course," Diaz agreed, waving the limo forward. "It *is* a long flight, isn't it? I remember the first time I flew to the United States—I don't think I'd ever before had a true feeling for just how *long* South America really is."

"I had the same thought," Sommer nodded. "Somewhere over Peru, I think."

Diaz smiled. "Well, you'll have a couple of hours now to recover from the trip."

"I thought the first official function was the formal dinner tonight," Sommer frowned.

"It is," Diaz said, a slightly sour look on his face. "But the great dog media proved harder to put off than even the most impatient of our own government officials. I'm sure you're familiar enough with media sorts, Doctor—if you take their bone away from them in one place you must give it back elsewhere or suffer through their incessant howling." He shrugged uncomfortably. "In this case, the only way to keep them from the airport was to promise a news conference at the Ministry this afternoon."

Unless you just decided to shut them all down for the duration, Sommer thought with a touch of fatigue-driven cynicism. Unfair, really—for all the tendencies to excess inherent in military rule, the current junta *did* seem to be working hard at tolerating its detractors. "No problem, General," he assured the other. "When did you schedule it for?"

"Four o'clock." The limo pulled up beside Diaz and a smartly dressed sergeant jumped out to open the rear door. "Exactly—" Diaz consulted his watch—"two hours twenty minutes from now."

"That'll be fine," Sommer nodded, ducking his head and climbing into the limo.

"Your communications said you wouldn't require more than the one suite," Diaz continued, ushering Compton in beside Sommer and pointing Alvarez to the seat facing them, "but nevertheless we have had three more suites reserved for you, in the event that you changed your mind."

"That won't be necessary," Sommer

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told him. "We brought only a handful of other people with us, and they'll be staying aboard the plane. It's quite comfortable," he added as Diaz seemed about to protest. "A sort of scaled-down version of Air Force One."

Diaz shrugged and got in beside Alvarez. "As you wish, Doctor. The offer will remain open, though, for the duration of your stay." He leaned forward. "To the hotel."

"Yes, sir," the driver nodded.

"I have to confess," Sommer commented as they started across the tarmac toward a distant security fence, "that I was a little surprised to learn that the Soulminder facility here was under the Interior Ministry's jurisdiction. In most countries we work directly with the health ministry."

"Ah—but in most countries the Soulminder is reserved for the rich and powerful," Diaz countered. "In Chile, it is open to all—and so who better to operate it but Interior?"

It was a vague logic, one that several weeks of thought on Sommer's part had failed to really penetrate. "Yes, of course," he said. "I wonder, General, if you'd tell me just what exactly your vision is for Soulminder in this country."

Diaz frowned. "You were sent our full proposal."

"Proposals are written by bureaucrats. I want to hear it in your own words."

The general's face cleared. "Ah. I see." Turning his head, he gazed out the window, and for a moment he was silent. "As I mentioned before, Dr. Sommer," he said at last, his voice low, "in most countries—including the United States—your Soulminder safety net is available solely to those who can afford to pay the price. The very rich, the very powerful, and their friends."

"And the middle class," Compton murmured.

"Many countries have no middle class," Diaz shook his head, showing a brief spark of annoyance at Compton's interruption. "And even in those that do, there are still many others who are too poor to afford the Soulminder's protection."

Sommer nodded, an echo of old frustration sending wisps of acid pain through his stomach. It was a problem that had haunted the edges of his thoughts for nine long years, ever since the very beginning of Soulminder's commercial existence. If the Chileans had finally solved that problem. . . .

"Regardless," Diaz continued, "in Chile we saw that happen—saw the inequity, saw the unfairness—and resolved that it would not happen here. And so, when you granted us our first Soulminder facility, we set out to find a way all could share in it."

He turned back to Sommer, a new fire in his gaze. "*That,* Dr. Sommer, is our vision," he said quietly, earnestly. "A nation with every single man, woman, and child protected against unnecessary and premature death. A nation whose people are allowed to live out their full lives. . . . and, perhaps, to live even beyond that."

An unpleasant shiver ran up Sommer's back. *To live even beyond that.* "Soulminder is a medical tool," he reminded Diaz firmly. "If it allows people to live out their normal lives, that's really all we can expect from it."

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"Of course, Doctor," Diaz said easily. "I was referring merely to the vast research you and others are putting into medical advances. Advances we can hope will push back by a few years the death which is, of course, inevitable."

"Of course," Sommer echoed. But the words were polite and meaningless, and both men knew it. Like Jessica Sands, Diaz was looking to Soulminder's future. . . . and saw there the dream of immortality.

A dream that already possessed Sands. Sommer could only hope it didn't do the same to Diaz. The future, he knew from bitter experience, could all too easily swallow up the present.

The hotel suite wasn't the most luxurious that Sommer had ever been in, but it easily made it into the top ten. Extending over the hotel's top two floors, the levels connected by a wide spiral staircase, the place looked like it had been designed to sleep an entire presidential entourage. The three of them, Sommer thought more than once, were going to feel just a little bit lost.

Their luggage arrived from the plane while they were still looking around the suite, a promptness that pointed to an extremely perfunctory customs inspection. Leaving Compton and Alavarez to unpack, Sommer took a quick nap, setting his alarm to leave him enough time to shower and shave before the news conference. His timing was right on the money; he'd just finished choosing his tie when the front desk called to say that General Diaz had arrived.

The news conference itself was a virtual replay of hundreds of similar ones Sommer had endured over the past nine years. Though there were a handful of questions about the technical aspects of traps and Mullner traces and a few about his own personal involvement with it all, the bulk of the questioning centered on the social implications of Soulminder for the people of Chile. Most of the questions he'd heard many times before, in a variety of different contexts, and he could probably have answered them in his sleep. Others were new, and actually required a certain amount of thought before he could respond.

And there were others—the more pointed political questions in particular—which were conspicuous mainly by their absence.

The news conference lasted until nearly five o'clock, after which it was back to the hotel for a quick change into black tie and a drive to the presidential palace for the formal welcoming dinner. What with the meal itself, the required round of glowing speeches, and the post-dinner mingling and conversations, it was after midnight before they finally made it back to the hotel.

"Well, that was fun," Alvarez commented, heading over to the suite's wet bar as Sommer shrugged off his jacket and shoes and flopped down onto an ornate but nevertheless comfortable couch. "You always get wined and dined this well, Dr. Sommer?"

"Not always," Sommer said, working at freeing his windpipe from the strictures of his tie. "It usually depends on how badly the hosts in question want something from me."

"In which case the generals must want that second unit pretty badly," Compton commented, pulling a portable bug-detector from his suitcase and

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beginning a leisurely stroll around the room. "You'll notice that among all the glitter and glitz they keep finding ways to remind you of how democratic and egalitarian they're being these days."

"You're a born cynic, Compton," Alvarez called, carefully measuring out a small nightcap.

"Cynics aren't born—they're trained," Compton countered.

Sommer eyed his security chief thoughtfully. "Back at the airport, Frank, General Diaz seemed to recognize your name. Does he know you?"

Compton shrugged. "Probably only by reputation. I spent a couple of years here in the late seventies, during the Pinochet era. The government and I had our differences."

"I don't doubt it," Alvarez commented, wandering back to the center of the room with his drink. "Weren't you still with the CIA back then?"

"Actually, the CIA was generally supportive of the regime," Compton said. "Bordering on worshipful, in some cases. I had the bad habit of thinking for myself, which didn't exactly endear me with anyone. Actually—"

He broke off as the phone next to Sommer trilled gently.

"Uh-oh—they heard you," Alvarez said, not entirely facetiously.

Compton moved toward the phone. Sommer waved him back, picked up the handset himself. "Hello?"

"About time," a familiar voice said. "I've been calling every twenty minutes since ten o'clock."

Sommer breathed a quiet sigh of relief. He hadn't really expected it to be the Chilean police . . . but still . . . "Hello to you, too, Jessica," he said. "Hotel switchboards *do* take messages, you know."

Jessica Sands snorted. "And they often keep them, too. So. How'd the evening go?"

"About as you'd expect," Sommer told her. "You really ought to join in these things sometime."

"No, thank you. Anyway, you're the one they all want to meet."

Sommer grimaced, but she was right. For most of the world, he, Dr. Adrian Sommer, was still the image and heart of Soulminder. "Lucky me," he murmured. "I hope you didn't call just to make sure we were getting to bed on time."

"Actually, I called to give you some news that may have not filtered down there yet. The Supreme Court verdict on *Arizona v. White* finally came in this afternoon. The law was upheld, six to three."

Sommer took a deep breath, let it out slowly. "Well. Not exactly unanimous, but I suppose it's better than a five-four split."

"It's a shade better than losing entirely, too," Sands countered. "Especially given that there are at least sixteen more states with Professional Witness statutes of their own who've just been waiting to see how Arizona's stood up."

"No stopping them now, I suppose."

He could sense Sands shrug. "The people want this, Adrian. I don't know if you heard about it, but an NBC poll taken last week showed up to 85 percent positive in some parts of the country."

"At least until the first case of fraud is proven," Sommer reminded her sourly. "At which point the egg is likely

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to hit the fan at an extremely high rate of speed."

"Well, that's ultimately not our responsibility," Sands said. "It's the legal establishment that's in charge of screening their Pro-Witnesses for honesty, stability, and sanity."

Sommer snorted a sudden laugh. "What?" Sands demanded suspiciously. "Come on, Adrian, let's have it."

Sommer sighed. "Sanity. A person *volunteers* to let us kill him and put his soul into storage, so that a bodyless murder victim can be transferred out of Soulminder into *his* body and testify at the person's own murder trial. . . . and you're looking for *sanity?*"

"That's not fair, and you know it," Sands growled. "Just because it makes *you* cringe doesn't mean everyone who joins a Pro-Witness program is a ghoul."

"I still think there's trouble ahead," Sommer sighed. "Thanks for calling in the update, though. Sorry we were so late."

"No problem—I was cleaning up some paperwork, anyway. I'll go ahead and fax copies of both the majority and minority opinions to the plane—you might want something to read on the flight home."

"The way I feel right now, I'll probably be sleeping most of the flight home."

"Hint heard and understood," Sands said dryly. "I'll let you toddle off to bed now. Let me know how it goes tomorrow."

"I will. Good night, Jessica."

Sommer replaced the handset and looked back up at the others. "*Arizona v. White* came in?" Compton ventured.

Sommer nodded. "Six to three in the people's favor."

Compton grunted. "Not exactly unexpected. Anything unusual in the opinions?"

"You can read them yourself later—she's going to fax them down to the plane."

Alvarez drained the last of his glass and set it down on the coffee table. "Well, if you'll excuse me, Dr. Sommer, I think I'll turn in now."

"That's probably a good idea all around," Sommer said, pulling himself vertical with an effort. "We've got a lot of work ahead of us tomorrow."

"I'm looking forward to it," Alvarez said. "Good night, sir." With a nod to Compton, he disappeared off to one of the bedrooms.

"I remember when I could be that enthusiastic after midnight," Sommer commented to Compton.

"Quiet pride works as well as enthusiasm," the other said. "It's easier to maintain, too."

"Um. You might as well turn in, too—if anyone planted any bugs while we were out, they're not going to learn anything tonight."

"Yeah." Compton paused. "You didn't seem all that pleased that the Pro-Witness program's gotten the green light."

Sommer shrugged. "The whole idea of a person making a career of loaning out his body still bothers me, I guess. I'm sure I'll get used to it eventually."

Compton nodded. "Not all that different from surrogate mothers, if you want to be technical about it." He rubbed his cheek thoughtfully. "You know, sir, it occurs to me . . . I don't

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know if the numbers have been made public yet, but during the time that the Arizona program's been going there's been a visible drop in violent crime rates. Especially against people wearing Soulminder ID bracelets."

"I'm not surprised," Sommer grimaced. "Knowing that even murder won't cover your tracks probably makes the average armed robber stop to think a little."

"As well as the average rapist, the average homebreaker, and the average kidnapper," Compton nodded. "The numbers are down in all those categories. But now—" he waved a hand, the gesture encompassing the city around them—"we have the Chilean government proposing to put everyone in Santiago on file with Soulminder in the next five years. If the Arizona pattern holds . . . we could get something here worth taking a close look at."

Sommer pursed his lips. No premature deaths, a steady increase in lifespan . . . and now a drastic reduction in violent crime. Paradise restored to Earth, courtesy of Soulminder and the Chilean government. It sounded too good to be true.

Far too good to be true.

"Agreed," he said grimly. "Let's just make sure it's a *very* close look."

There were, by prior arrangement, two cars waiting for them when they came down the next morning. One, with Alvarez inside, headed off to the Interior Ministry, where he'd been assured by General Diaz that he would have carte blanche to examine any records relating even remotely to Soulminder's fiscal operations. Sommer and Compton, riding in the second car, headed in the opposite direction, arriving ten minutes later at the modern building housing Soulminder itself.

General Diaz was waiting in the medical section anteroom as they entered. "Ah—Dr. Sommer; Señor Compton," he greeted them. "I trust you both slept well?"

"Very well indeed, General," Sommer assured him. "I didn't expect to see you here today."

Diaz shrugged, smiling almost shyly. "And let someone else show off my Soulminder facility to you? Pride is, I'm afraid, one of my many weaknesses. Come—we can start with the tracing rooms."

Sommer had visited dozens of Soulminder facilities throughout the world, and was always fascinated at the myriad of ways variations could be played on what was essentially a common theme. The tracing rooms, where clients underwent the recording of their Mullner soultraces, were here little more than narrow booths, an efficiency of space that had enabled the Chileans to squeeze eighteen tracing stations into a space that would normally have been occupied by ten. "As I recall, General," Sommer commented, looking down the rows of doors, "your proposal included the expansion of this facility to first thirty and then fifty Mullner tracers. Where on earth do you intend to put them?"

Diaz gestured toward the window at the end of the hallway. "We would need to expand, of course. Our plan would be to purchase the building across the street and move all the tracing facilities there, leaving the transfer operations and core in this building."

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Sommer nodded, wondering if the reference to purchasing had been solely for his benefit. There were certain elements of the junta, he'd heard, who believed that private property was merely state property that the government had no use for. He made a mental note to have the local Soulminder staff confirm that a fair price was paid when the purchase went through.

Or rather, *if* it went through. Shaking thoughts of local politics from his mind, he paused outside one of the tracing booths and got his thoughts back on the subject at hand.

The tracing procedure had been greatly improved since the first crude Mullner device he and Sands had first started recording soul-traces with, but there had been some limits that further research had failed to budge. Even as he watched, the operator finished the final adjustments to the client's headband and touched the recording switch—

And the client's eyes closed, his face stiffening in a look of sheer terror.

"Bad dreams," Diaz murmured at Sommer's side. "They affect perhaps half of those who undergo the procedure."

"I know," Sommer nodded, stomach tightening. His own first-hand experience with the tracer hadn't been very pleasant, either. He watched as the man's face smoothed out, the other drifting into a deep sleep. . . . and two minutes later, it was all over.

The operator touched another button and began unstrapping the headband. By the time he'd finished, two orderly-types with a wheelchair had arrived, brushing past Sommer with muttered apologies to enter the booth and manhandle the client out of the recording chair and into the wheelchair. "Recovery room?" Sommer asked.

"This way," Diaz pointed. "If you'd like, we can simply follow this client there."

"That would—"

"Hold it," Compton cut him off, the other's eyes drifting with concentration. "Listen . . ."

Sommer held his breath. . . . and then he heard it, too: the thin wail of an ambulance.

Getting louder.

He looked at Diaz, but the other had already guessed the question. "Yes," he nodded, "it sounds like someone on his way here. Come—we'll find out which transfer room has been prepared to receive him."

They were waiting when the man was brought in—a younger man, from his clothing, probably middle class. "What happened to him?" he asked.

One of the ambulance men rattled off something too fast for Sommer's limited Spanish to follow. "Frank?" he murmured.

"He was murdered by a terrorist gang," Compton translated.

Sommer looked at him sharply. "He was *what?*"

"Señor Compton is correct," Diaz said, his voice dark and angry. "Left-wing terrorists are once again becoming active around Chile."

Sommer frowned across the room, trying to see the patient around the physician and transfer techs moving between him and the table. "I don't see any sign of bleeding."

"Oh, they don't use firearms for this sort of thing," Diaz snorted. "They

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seem to find it more amusing to use a more native form of death: curare-tipped airgun darts."

"Quieter and far less easy to trace," Compton said. He glanced meaningfully at Sommer; grimacing, Sommer nodded back.

So much for the elimination of crime.

At the table one of the techs inserted a needle into the victim's arm and hung the attached IV bottle to a hook. "What's the IV for?" Sommer asked.

"It's a glucose drip," Diaz answered. "It's standard procedure for all transfers here."

"I see," Sommer murmured, trying to remember if he'd seen any references to that in the Chilean reports. It seemed a totally superfluous addition to usual Soulminder procedure. The doctor had a hypo now, and was injecting it into the patient's neck. "I presume he was given neuropreservatives on the ambulance?" he asked.

"I would presume so," Diaz said, "That, too, is standard procedure."

Sommer nodded. The doctor's hypo, then, would be a flushing solution, designed to remove the remnants of the neuropreservative from the patient's system. That, at least, *was* standard Soulminder procedure. The other finished the injection, stepped back to the control board—"Wait a minute—he can't start the transfer yet," Sommer said, starting forward.

Diaz's hand on his arm stopped him. "I'm sure he knows what he's doing, Doctor," the general said soothingly.

Sommer wasn't nearly so sure. He'd seen firsthand what would happen if a soul transfer was tried before the neuropreservative was completely flushed: namely, nothing at all. The soul wouldn't remeld with the body under such conditions, and trying to force it would do nothing but put added strain on the brain chemistry. If the attending physician was inexperienced enough to try it anyway. . . .

He wasn't. His interest in the Soulminder control board was apparently merely a double-check of the equipment's readiness, and after a careful inspection he turned back to the table and settled in to wait.

Sommer clenched his teeth, feeling rather foolish. "I didn't realize the insurgency problem had started again," he said, more to change the subject than anything else.

"It was never entirely gone," Diaz said. "We've made great strides toward reform, but for some people nothing is enough."

"Odd that they'd pick on a man clearly wearing a Soulminder bracelet," Compton commented.

Diaz shrugged. "We think it's their way of harrassing the government. Forcing us to go through the trouble and expense of reviving one of our citizens, perhaps hoping to prove we don't really care for the common people at all."

"So how many of Soulminder's clients *have* they picked on?" Compton persisted.

"A fair number, I know," Diaz said. "I'd have to look up the exact figures."

"If they were all attacked with the same curare darts, the numbers will be too trivial to retrieve from the main Soulminder records," Sommer nodded. "As soon as we've finished with the perimeter facilities, we'll be going into

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the Core—we can have the stats dug out then."

Diaz's snort was just barely audible, but Sommer knew what it meant. "I'm sorry, General," Sommer said, turning back to the other, "but my hands really *are* tied on this. I'm sure you can understand the reasoning behind it."

"I understand," Diaz said, his voice under careful control. "You will understand, in turn, if I find it insulting that you refuse to allow Chilean nationals into the Soulminder inner sanctum."

"It's not just you," Compton put in before Sommer could reply. "Every country's treated the same. Security considerations dictate that *only* specially chosen people be allowed access to the main Soulminder equipment."

Diaz locked eyes with him. "To you, perhaps, it is security," he said softly. "To many of us, it is little less than a form of economic imperialism."

"It's protection of a trade secret," Compton countered, his quiet voice a match for Diaz's.

For a split-second there was genuine hatred in the general's eyes . . . but even as Sommer braced himself for an explosion the general took a careful breath and relaxed fractionally. "Call it what you will," he said stiffly. "It's still in many ways a slave's collar around our nation's neck."

Across the room, the man on the table twitched abruptly and gasped something. Sommer spun back, relieved that the awkward confrontation had been interrupted but simultaneously annoyed that he'd missed the crucial parts of the transfer procedure. Unlike the Soulminder people behind the Core's security wall, all the personnel out here *were* Chilean, most of them trained locally along Soulminder guidelines. . . . and nothing could replace firsthand observation as a method of evaluating how closely those guidelines were being followed. "I'd like to watch another transfer," he told Diaz.

"Of course," the other said, his eyes on the revived man, the anger of a moment earlier replaced by an almost grudging sense of wonder. "It never ceases to amaze me, Dr. Sommer. That a man could be brought back from the dead. . . ." He shook his head minutely and took a careful breath.

For a moment all three watched in silence as the doctor completed the final check and one of the techs helped the patient off the transfer table. A little wobbly, but otherwise clearly recovered from his ordeal, he was helped into a wheelchair and guided toward the door.

And on his face, as he passed them, was an oddly absorbed expression. The expression, Sommer knew, of a man who had taken a look beyond earthly life. Who had waited, all alone, in the gray Soulminder tunnel.

Who had faced the light.

"A miracle, indeed, General," he said, a gentle shiver running up his back at the memory.

"Yes," Compton put in. "Kind of puts national pride in perspective, wouldn't you say?"

Diaz threw him a look that was almost a glare, but merely nodded. "Perhaps. Perhaps not. If you're ready, Dr. Sommer, I'll escort you to the Core."

Sommer swallowed. The spell was broken, the miracle gone. Now, it was back to straight, hard-headed business again. Perhaps that was exactly what

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Compton had been going for. "Lead on, General," he sighed.

From the beginning, Jessica Sands had decided that the secrets of the Soulminder equipment would remain solely with her, Sommer, and what would eventually become the corporation's inner circle. The result was that the central chamber—the Core—of each Soulminder facility always reminded Sommer of a cross between Fort Knox and NORAD's Cheyenne Mountain fortress.

For Compton and him, of course, the entrance procedure was reasonably straightforward. Sommer had sent their official clearances via scrambled satellite signal a week earlier, and the counter-checks had also already gone through. At that point all that remained was for the two of them to provide handprints, hold still long enough for the computer to run surface facial and bone structure comparisons with the clearance records, and submit to the standard multi-spectrum scan for concealed weapons, microphones, electronics, dangerous chemicals, and whatever else Compton's security experts had thought of to look for.

In nine years no one had yet managed to penetrate a Soulminder Core. Sands and Compton were determined to keep it that way.

"Dr. Sommer; Mr. Compton," a smiling young man greeted them as they came through the final screening and passed through the vault-like inner door. "Welcome to Soulminder Santiago. I'm Martin Van Proyen, in charge here. I don't know whether you remember me, but I was one of the people you met with in London two years ago when the Italian government went through that corner-cutting fiasco."

"Of course," Sommer assured him, offering his hand. "You were assistant head of the Rome office, as I recall. Congratulations on your promotion."

"Thank you, sir," Van Proyen nodded as he shook hands with Sommer and then Compton. "Actually, I'm not sure I *have* been promoted—officially, I'm still listed as an assistant head, temporarily in command here until someone a little more senior is found. But since that assignment was a year ago—and since they're giving me full Station Chief pay and benefits—I think I can assume the promotion came through."

Sommer grimaced. "Probably can, yes. Sorry about that—what with all the countries clamoring for Soulminder facilities, the personnel office has been sort of buried lately. I'll look into it when I get back."

"I'd appreciate that, sir. Well—" Van Proyen waved around him. "This is it. What can I show you?"

Sommer looked around. The Core of each Soulminder office was always the same: a half dozen small offices and work areas surrounding the central section, where the computers and actual soul-trap equipment were kept. "I'd like to start with the finance records," Sommer told him. "I'm particularly interested in how the costs per Mullner tracing and soul transfer compare to other Soulminder offices around the world."

Van Proyen's forehead furrowed. "We can take a look, but I'm pretty sure they're comparable," he said. "Our operational costs aren't anything

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special, either high or low. The Chilean government's certainly been paying the standard fees, and we've been forwarding them to Washington faithfully."

"The money's all been coming in," Sommer assured him. "My interest is in how exactly the Chileans plan to put everyone in Santiago on Soulminder for the price they're proposing."

"Ah," Van Proyen nodded. "That. You've got me, Dr. Sommer—all I can suggest is that they're somehow cutting their own bureaucratic costs."

"Or else they're cutting quality," Sommer countered grimly. "In which case, your records ought to show a pattern of incompetence or inexperience from the Chileans working out there in the Periphery."

Van Proyen nodded. "I haven't noticed anything obvious, but then I'm not a walking statistician, either. Let's go to my office and we can start digging. Oh, before I forget, there was a phone call for you earlier this morning. Archbishop Manzano asked if you might call him whenever you got the chance."

Sommer stared at him. "The archbishop called *me?*"

"And called here?" Compton murmured, his tone thoughtful. "Interesting."

"What's so interesting?" Van Proyen shrugged. "He probably wasn't able to get in touch with you at the hotel."

Sommer eyed Compton, an uncomfortable feeling beginning to gnaw at the pit of his stomach. "We haven't been *that* hard to find," he said slowly.

Compton nodded. "I agree. I'd guess he called here because our phone lines are more secure than the hotel's would have been."

The uncomfortable feeling grew stronger. "You know the archbishop, Mr. Van Proyen?"

"Not personally. He's something of a local hero among the people, though—he was a strong supporter of democracy before the Santos junta took power, and he doesn't hesitate to speak out against governmental injustice and reform foot-dragging."

Sommer nodded. The archbishop's exploits as the people's unofficial advocate had received a fair amount of international media coverage over the past year or two, but Sommer never quite trusted media darlings to live up to the hype surrounding them. Apparently, this one did. "Did he leave a number?"

"Yes, it's on my notepad. This way."

Van Proyen's desk was as cluttered as Sommer's own workspace, but like Sommer, the younger man seemed to know exactly where everything was. Unhesitatingly, he pulled a pad from underneath a fat printout and handed Sommer the top sheet. "I think that's his residence," he added. "He said he'd be there all morning."

Sommer nodded. Pulling the phone over, he punched up the number. One ring . . . two—"*Hola,*" a man's voice answered.

"This is Dr. Adrian Sommer," Sommer said, belatedly wondering if the archbishop even spoke English. "I have a message to call Archbishop Manzano."

"Ah—Dr. Sommer," the other said, switching to thickly accented English. "I am Archbishop Manzano. Thank you very much for returning my call."

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"No problem, your Excellency," Sommer said, trying to keep his voice casual through a dry mouth. On Van Proyen's phone a red light had begun flashing, alerting him that the call was being monitored. Probably not all that surprising, really, if the archbishop was as much a thorn in the junta's flesh as Van Proyen had indicated. "What can I do for you?"

There was just the briefest hesitation on the archbishop's part, and then, strangely, the wiretap indicator flickered once and then went out. "I mainly wanted to add my voice to those urging you to allow the expansion of our Soulminder facility," the other continued. "I'm sure you realize that the greater part of the Soulminder is reserved for government officials and the upper and technical classes. Only if the program is expanded can the poorer of our people be so protected."

Sommer frowned at the phone. "Ah . . . yes, your Excellency, I'm aware of that. It was my understanding, though, that a sizable fraction of the Soulminder facilities already here were reserved for the poor."

"That is true," the other agreed. "But the fraction is not nearly sizable enough."

"I understand, sir," Sommer said. There was something vaguely off-key here, but he couldn't put his finger on it. . . . "Perhaps we could meet later and discuss what's being done for Santiago's poor."

"I would look forward to such a meeting," the other said. "I'm sure your schedule is very heavy, but if you find a free hour please give me a call."

"I'll do that, your Excellency," Sommer assured him. "Thank you for your call. I hope we'll be able to make connections while I'm here."

"Good-bye, Dr. Sommer, and may God continue to bless your work."

"Good-bye, sir."

Sommer lowered the handset carefully back into its cradle. "Trouble?" Compton asked.

"I'm . . . not sure," Sommer told him.

"Let's find out." Pulling Van Proyen's chair out from the desk, Compton sat down, keying a handful of commands into the computer. "Probably should start by getting both sides of the conversation."

Sommer leaned over his shoulder as the screen filled with a transcript of the conversation. "It wasn't anything he specifically said," he told Compton. "More like the *way* he said what he did."

"Uh-huh," Compton grunted. "that and the fact that the tap on his line got lost?"

"Well, now that you mention it. . . ." Sommer paused as Compton keyed in some more commands, and to the right of the transcription a cryptic column of numbers and letters appeared. "What's all that?" he asked.

"Tonal information," Compton told him. "Plus . . . well, well, well. What a surprise." He looked up at Sommer. "The wiretap light went out because the line got switched on us."

Sommer exchanged glances with Van Proyen. "You mean the government cut us off?"

"That's it," Compton nodded, tapping a spot on the screen. "Right here. just after you asked what he wanted.

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Shunted you to a prepared line where they had either a good mimic or an electronic parrot waiting. Let's see if we can find out which."

"How?"

"Voiceprint analysis—there's a nice little package of programs around for that sort of thing," Compton told him, fingers skating across the keyboard. "Standard issue at Soulminder offices—you'd be surprised at the stuff foreign governments and industrial spies try and pull on us. . . . There we go. Electronic parrot, all right. Damn good one, too. Let me get a deep-probe going on it, see if we can figure out whose design it is. Might tell us where they got it."

Sommer chewed at his lip. "You think it's worth trying to call the archbishop back?"

Compton shook his head. "Not really. They were somehow caught flatfooted by his earlier call here, but they won't miss again."

Sommer looked past him to Van Proyen. "I suddenly don't think," he said quietly, "that we want to wait for Frank to finish here before we get started."

"Agreed," Van Proyen nodded, his expression tight as he started toward the door. "Come on—let's go scare up another terminal."

Sommer had expected the search to take perhaps half an hour. It took, in fact, nearly two hours.

And at the end they found nothing.

Van Proyen keyed to the last page of the analysis and leaned back in his chair. "It's not here," he announced unnecessarily, reaching back to massage his neck muscles. "Wherever it is the Chileans are saving money, it isn't with basic Soulminder functions."

Sommer glared at the display. "You absolutely sure we didn't miss anything?"

Van Proyen shrugged. "We looked at the Mullner tracings, transfer operations, non-hospital paramedical work, baseline storage and power costs, and work efficiency. That's all there is."

"It's got to be in the way the government's handling their end of things, then," Sommer growled. "Paying drastically reduced salaries, maybe."

"Well . . . maybe," Van Proyen said doubtfully. "But remember that that's one of the things the Italians did when they were trying to cut costs—and in *that* case, there was a big jump in worker turnover and general inefficiency. There's nothing like that here—average stay for the low-level workers was, what, fifteen months?"

"Something like that."

"And even the physicians are staying an average of a year or so," Van Proyen reminded him. "Physicians down here are notorious for jumping jobs if their pay doesn't suit them."

Sommer chewed at his lip. "Maybe the prestige of working for Soulminder makes up for starvation wages."

Van Proyen raised his eyebrows politely. "Would it make it up for *you?*"

"I doubt it," Sommer admitted, getting to his feet. "Well, whatever they're doing, at least we know for sure now that the difference is coming out of their half of the pie. I suppose that qualifies as progress."

"Probably." Van Proyen got to his feet. "Your man Alvarez probably has

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it all scoped out by now. Assuming, of course, it isn't buried too deeply."

Sommer grimaced. "That's what bothers me. Why it should be buried at all."

General Diaz had left, they found as they emerged from the Core, but he'd left his car and driver and a message to phone him whenever they were ready to continue their tour.

"Is there really anything else to see?" Sommer asked Van Proyen.

The other shrugged. "Not really. There's some administrative stuff, mostly concerned with the Chilean staff and supplies and all, and I suppose if you really wanted to you could hang around and watch another transfer." He stepped to the Core receptionist's desk, tapped out a command on her computer. "There's one going on now, and four more scheduled later today—accident victims, all of them, who've spent the last few weeks healing in the hospital."

Their bodies technically dead, with only full life-support keeping the biological functions going. The whole concept still gave Sommer the shivers if he thought about it too closely. "No point to it," he told Van Proyen. "We already know that the savings aren't coming from the transfers. To the contrary —some of the things they've added to the standard procedure are actually boosting the cost."

"Those silly glucose IVs," Van Proyen snorted. "Yeah, well, the medical part is their business, and I've known hospitals in the States that were always throwing glucose at their patients, too." He spread his hands. "In that case, I guess the tour is over."

"Appreciate your time, Mr. Van Proyen," Sommer said as they shook hands. "Do me a favor, will you, and keep sifting through those records of yours."

"It might be interesting," Compton put in, "to check the Chilean records against those from Argentina, say. Some place comparable."

"Good idea," Sommer nodded. "I'll talk to Jessica later, see how much trouble it would be to collect those records and download to you."

"You get them here, and I'll run them through the grinder," Van Proyen promised. "You've got me fully intrigued now, Doctor. Good luck, and happy hunting."

The rest of the day was of the sort that Jessica Sands often referred to as a cotton-candy day: full and rich, but with little substance to it. Rejoined by General Diaz, they made a quick walk-through of the teaching hospital where Soulminder physicians and transfer techs were given the necessary specialized training. Then it was off to a luncheon of Santiago's business and civic leaders: good food and what turned out to be politely meaningless conversations. Afterwards came a tour of the mainsprings of Chile's economic revival, including a plant busily turning Chilean copper and yttrium into superconducting ceramion, a computer chip facility using that ceramion, and a technical institute for teaching young Chileans the science and technology they'd need to keep the boom going.

It was a long tour, made even longer by the need to periodically pose for the crowd of tagalong photographers who

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seemed determined to record the entire thing on film, and it was nearly five-thirty before they were finally able to return to the Interior Ministry and pick up Alvarez.

One look at his face was all Sommer needed.

"Well?" Sommer demanded when they were back in the hotel room and Compton had done his maddeningly slow search for microphones. "What did you find?"

Alvarez shrugged. "Actually, it's more negative information than anything else, but it's still real progress. The savings are definitely coming from the actual Soulminder operations."

For a long moment Sommer just stared at him, and the satisfied look on Alvarez's face slowly faded as he belatedly realized he wasn't getting the reaction he'd expected. "What's wrong?" he asked carefully.

"You checked the Chileans' own costs?" Sommer asked him. "Including the salaries they're paying their people?"

"Of course," Alvarez nodded, starting to look a little flustered. "With a fine-mesh sifter. Their costs are completely compatible with a Soulminder operation this size."

Compton rubbed his cheek thoughtfully. "Curiouser and curiouser."

Alvarez looked at him, back at Sommer, his expression now guarded. "Do I take it," he asked, "that you'd already decided that it was the Chilean side that had the whittled end of the stick?"

"You take it right," Sommer said wearily, dropping down onto the couch. "The station chief assures us that everything looks normal from where *he's* sitting, too."

Alvarez glared off at nothing for a moment. "Well, then, they're shifting money from somewhere else," he said. "That's the only explanation. They're fiddling the records, making their Soulminder activities look cheaper than they really are."

"Then why are they keeping it a big secret?" Sommer demanded. "They have the perfect right to subsidize Soulminder if they want to—why all this smoke screen about a cheaper way of doing it?"

"Perhaps," Compton said slowly, "it's because they don't want us to know where the money's coming from."

Sommer's stomach tightened. "As in, it might be coming from some kind of illegal activity?"

Compton shrugged. "Military governments often have a tendency toward that sort of thing. Alvarez, did you happen to check out their copper production records?"

Alvarez frowned. "I glanced at the figures. The industry's booming, of course, but don't forget that the unions have the miners' wages set at a pretty reasonable rate these days. I can't see them pulling all of the Soulminder shortfall from there."

"I was thinking more along the lines of whether they might be siphoning off some of that copper," Compton told him. "Maybe to unlicensed superconductor or chip manufacture. They've got the facilities, that's for sure, and they certainly wouldn't want us to know about it."

Sommer shook his head. "But why pour the money into Soulminder at all?

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It just doesn't seem compatible for them to be stealing money and then using it for altruistic purposes."

"Maybe they want to go down in history as the first nation to offer Soulminder protection to all its citizens," Alvarez suggested. "I can see them doing it for ego."

Peripherally, Sommer saw Compton stiffen a bit. "Dr. Sommer," the security chief said carefully, "do you remember the list of people the Chileans already have on Soulminder? Mostly the military and political leaders and educated classes, but it also included people like Archbishop Manzano who are outspoken critics of the government."

Sommer nodded. "It was one of the reasons we decided to take their expansion proposal seriously. It implied a commitment to keep their use of Soulminder non-political."

"Does it?" Compton asked. "What it implies to *me* is that they want everyone—including their enemies—to have a Mullner trace on file."

For a long minute Sommer stared at him. "Are you suggesting that they've found a way to pull personal information out of Mullner traces?"

Compton's eyes bored into his. "I think," he said quietly, "We'd damn well better find out."

A cold chill ran up Sommer's back. The vast and intricate tangle of embellishments that made up a human Mullner trace had so far defied every attempt at all but the broadest interpretation. . . . or it had, at least, in Soulminder's own labs. If the Chileans had found a way to crack the code . . . "Well, whatever's going on, we can't do anything about it now," he said reluctantly. "General Diaz will be picking us up for dinner in an hour, and I don't want to try to call Washington from here. Maybe after dinner we can make up an excuse to drop by the Soulminder office and use the satellite link—"

He broke off as the phone trilled. Frowning, he picked up the handset. "Hello?"

"Dr. Sommer?" a familiar voice said. "Hi, this is Martin Van Proyen at Soulminder. Awfully sorry to bother you, sir, but I'm afraid that when you and Mr. Compton finished using the terminals here this morning you left them locked into your personal codes. Would it be possible for you to come by sometime tonight and unlock them?"

Sommer's mouth went suddenly dry. Neither he nor Compton had a personal computer code capable of doing any such thing. But the government people presumably tapping his phone wouldn't know that. . . . "Sorry about that," he said, striving to sound casual. "We'll stop by on the way to dinner tonight, all right?"

"That would be fine, Doctor. Sorry for the inconvenience, but it's kind of vital that we get the terminals freed up."

Vital . . . "We'll be there in forty-five minutes," he said through dry lips. "Good-bye."

"Sorry to have dragged you back here," Van Proyen apologized as he escorted the three of them through the Core's security gauntlet. "I hope the cloak and dagger approach didn't worry you—after that thing with Archbishop Manzano this morning I thought I should make this sound as harmless as possible. Though, actually, the truth sounds pretty

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harmless even taken straight. This way, please . . ."

The Core was nearly deserted, with only a few staff people on hand to keep an eye on evening operations. Van Proyen led them to what turned out to be the main records office. "I was shuffling through the files like you'd told me to," he said, busying himself with one of the terminals, "when totally by accident I ran into a real puzzler. Let me first tell you that virtually every physician in Santiago is on file with Soulminder."

"No big surprise," Compton murmured. "The government's been concentrating on the more educated classes."

"Right," Van Proyen nodded, "and that didn't bother me. What *did* bother me was that nearly 60 percent of the doctors who are now involved in some way with Soulminder have themselves been through the procedure."

"They've *what?*" Sommer frowned.

"Died and gone to Soulminder," Van Proyen said grimly. "Like I said, I'm not sure what it means, but it sounded crazy enough to bring to your attention."

"Crazy and a half," Sommer agreed uneasily, hunching his chair close to the terminal display. "What about the other, non-medical workers? Can we check on those?"

"Already did." Van Proyen punched up another set of numbers. "You can see that there's an almost linear progression of percentages from the menial workers up the line to the more skilled, topping off with that 60 percent of the doctors. That number down there—" he indicated it—"is the overall percentage of Santiago citizens who've gone through the Soulminder."

A number, Sommer noted, that was reasonably comparable with the percentage of menial Soulminder employees who'd used the facility. "Again, that may not be all that significant," he said slowly. "The more skilled the employee, the more likely he'd be on file in the first place."

"Sixty percent is still way too high," Alvarez shook his head.

"Agreed," Sommer nodded. The conversation back at the hotel drifted into his mind. "Can you get me an overall salary schedule?" he asked Van Proyen.

"Sure." The other bent again to the keyboard. "Remember, though, that the schedule is just a guideline—all the Chileans are being paid directly by the government."

The salary schedule appeared on the screen. Sommer frowned at it, trying to make a quick estimate in his mind—

"You thinking blackmail?" Compton asked.

Sommer shrugged. "Why not? If we assume that the government's learned how to read a person's innermost secrets from their Mullner trace, blackmail becomes trivial."

"Except that all they have to do then is hire people who are on file," Compton pointed out. "Going through Soulminder itself would be a waste of money."

Sommer gritted his teeth as the idea evaporated beneath the logic. "You're right," he admitted.

"Besides," Alvarez put in, indicating the numbers, "even if you put everyone who works here on starvation

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wages the savings wouldn't add up to more than 20 or 30 percent of the shortfall they've got in Soulminder costs."

"Well, it was a thought," Sommer said.

"On the other hand . . ." Alvarez said thoughtfully, his voice fading away.

Sommer twisted to look up at him. "Something?"

Alvarez was frowning off into space. "On the other hand," he repeated, "it might be instructive to run a quick check on the other Soulminder patients. See what's happened to them."

"You have access to Santiago's city records?" Van Proyen asked dryly.

"No," Alvarez conceded. "But I think I *can* get you into the government employment roster."

Van Proyen cleared his throat. "Well, that's a start," he said, striving to sound casual. "Of course, breaking into their files is probably illegal. . . ." He looked questioningly at Sommer.

Sommer stood up and gestured Alvarez into the chair. "Try not to get caught," he said.

Visibly bracing himself, Alvarez sat down in the vacated chair and got to work. "I just hope they haven't changed any of the pass codes since this morning. . . . No, I guess they haven't."

"It's getting late, Dr. Sommer," Compton reminded him. "The driver's going to wonder what's going on."

Sommer grimaced. "Yes, I suppose we ought to get going."

"If you don't mind, sir," Alvarez said, his eyes still on the screen, "I'd like to keep going on this."

Sommer nodded. "All right. I'm sure we can make up some excuse for you. Frank . . . ?"

He turned . . . to find Compton gazing into space. "I'd like to make a quick call first, sir, if I may. To the States, on the direct satellite link."

"There's a phone in the next office," Van Proyen offered, pointing.

"I'll wait for you in the car," Sommer told him.

"I'd rather you wait here," Compton said, his voice oddly dark as he headed for the door. "If I'm right . . . I'd just rather you didn't get out of my sight, sir."

Sommer swallowed. It took a lot to make Frank Compton nervous—and if he was nervous, it was probably time for Sommer to be nervous, too. "All right," he said, "Make it fast."

The dinner and its accompanying niceties fit easily into the same lavish mold as had the previous night's dinner. . . . but now, with the mystery of the Soulminder employees nagging at him, Sommer found that his perception of the Chileans's activities had drastically changed. The luxury of the meal was an attempt to put him subtly in their debt; the complimentary speeches a trick to lull him into complacency; the whole round of social events themselves a means of keeping his attention off the real purpose of his trip. He could feel his conversation becoming guarded, his eyes and ears probing for nuances and hidden meanings in even the most casual of remarks. He was acutely aware of General Diaz's movements and comments, and nearly had a heart attack when the other was called from the room for a few minutes.

Only when the general returned and nonchalantly resumed his meal did

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Sommer finally realize just how far into paranoia he had slipped. It was a sobering thought, but it did little to help.

Eventually, the festivities came to an end.

"Perhaps you'd like to join me for a tour of Santiago's night life," General Diaz suggested as he guided Sommer and Compton down the steps toward the waiting car. "We're very proud of the variety of entertainment available here, and I think it would be both enjoyable and entertaining for you."

"Thank you," Sommer told him, "but I'm afraid business once again calls. I need to get back to the Soulminder office—there's some kind of flap going on up in Washington, and I need to sit down and get the complete story."

"I understand," Diaz said, with no hint of suspicion Sommer could detect. "There'll be a car waiting whenever you're ready to return to the hotel."

"Thank you, but that won't be necessary. One of the Soulminder employees can give us a ride."

"But I insist," Diaz said firmly. "You're our guests—we will not have you hitching rides like some peasant."

Sommer gave up. "In that case . . . thank you."

Alerted by the main reception desk, Van Proyen was waiting for them at the entrance to the Core. "Get a grip on your vitals," he warned as he ushered them in. "This one's going to bounce you off the ropes."

The security clearance seemed to take forever, but at last they cleared the inner door. Alvarez was waiting in the records office, looking both tired and oddly disillusioned. "I think we've found it, Dr. Sommer," he said, waving vaguely at the terminal in front of him. "Take a look."

Compton at his side, Sommer stepped over and peered at the screen. "What is it?"

Alvarez pointed to the top of the screen. "That first number is the overall percentage of government workers who've been through Soulminder. This is the breakdown by profession and current position, with real salaries before and after entering government service. And *this* is the record of how many of those switched to their government jobs only after going through Soulminder."

For a long minute Sommer stared at the numbers. "There's no chance of a mistake?" he asked at last.

"I don't think so," Van Proyen said quietly from behind him. "The Chilean government is giving its citizens free access to Soulminder. . . . in exchange for turning them into slaves."

"At least," Compton said into the silence that followed, "it isn't any blackmail magic with the Mullner traces. I suppose that's something."

Sommer nodded, still staring at the numbers. Physicians, transfer techs, copper mine engineers, chip designers—all high-demand professionals, all working now at what was probably a tenth of their marketplace salaries. "So what do they hope to gain by extending the program to the less educated classes?" he asked.

Van Proyen and Alvarez exchanged glances. "I don't know," Van Proyen answered for both of them. "Unless they want to maintain a pool of unskilled labor they can throw into the copper

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mines without having to pay union wages to."

"The forced government service may only be temporary, too," Compton pointed out.

"More like an indentured servitude than actual slavery," Van Proyen agreed. "And if that's the case, they'll need to keep replacing them."

Compton rubbed his chin thoughtfully. "There may be more," he said, stepping over the phone and punching a long series of buttons. "It's a little soon, but let me see if my friends have come through yet," he added, touching the speakerphone button and replacing the handset.

The phone was answered on the first ring. "Soulminder; Dr. Sands."

"Doctor, this is Frank Compton," Compton identified himself. "Have you had any response on that request I asked you to place?"

"Yes, indeed," she said, and from her tone Sommer could visualize a sour look on her face. "Is Adrian with you?"

"Right here, Jessica," Sommer called. "Along with Mr. Alvarez and Station Chief Van Proyen. What's this all about?"

"I'm not exactly sure myself," she growled. "And I don't especially like playing blind-man's messenger, Frank. Anyway, here's the list: South Africa, Bulgaria, Central African Republic, Nicaragua, and the Soviet Union. So what does it mean?"

Compton hissed gently between his teeth. "Those are the countries secretly helping the Chileans fund their Soulminder experiment."

"Odd combination," Van Proyen murmured.

"Not when you consider that all of them have a certain problem with dissident elements," Compton said grimly.

"Why do I get the feeling," Sands said, "that I'm missing some of the pieces here?"

Sommer gritted his teeth. The shock was starting to fade now, giving way to a steadily growing anger. "We've uncovered indications that the junta's using Soulminder to put its citizens into an effective slavery."

"Those who are unfortunate enough to die at the right time, anyway," Alvarez muttered.

Abruptly, Compton seemed to stiffen. "Van Proyen—get on that terminal. You have access to a news/media database?"

"Of course," Van Proyen said, stepping to the terminal as Alvarez hastily vacated it. "Chilean and international both."

"Chilean will do," Compton told him. "Do a search for the names of well-publicized dissidents and correlate it with the Soulminder records. Find out how many of them have gone through Soulminder and then disappeared into some obscure government post up in the mountains somewhere." He pursed his lips. "And check on how many of them went through Soulminder because of curare poisoning."

Sommer stared at him, a cold knot gripping his stomach. "Are you suggesting . . . ?" His tongue froze, unable to say it.

"That the junta's own death squads are behind the curare murders?" Compton said it for him. "Why not? It's certainly the simplest way for them to handpick the people they want."

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Sommer took a shaky breath. "Well, then . . . that's that."

"That's *what,* Adrian?" Sands asked suspiciously.

"That's it for Soulminder Santiago," Sommer told her. "If Frank's right about government death squads, we're pulling out of here."

"On what grounds?"

Sommer stared at the phone. "On what *grounds?* Are you serious, Jessica?"

Her sigh was a snake hiss from the speaker. "Adrian, I understand how you feel, and I sympathize. But the Chileans have an operations contract with us—a contract they've done nothing to break."

"What about the misuse of our technology?" Sommer demanded.

"And how do you prove it?" Sands countered. "Legally, I mean?"

"She's right," Van Proyen murmured. "The stuff we got from their database wouldn't be admissible."

Sommer threw him a glare. "They're using us to defraud their own people," he snarled. "They're paying Soulminder employees intern wages. They're *murdering* people, damn it!"

"All of which are internal affairs," Sands said icily. "I'm sorry, but they are. We have no legitimate excuse for canceling our contract."

"How about in the name of ordinary humanity?" Sommer shot back. "Or doesn't that count in business dealings?"

"Adrian, look," Sands said, her tone switching to a combination of cautious and soothing. "We are not in the business of crusading for truth and justice; we're in the business of preventing unnecessary death. If we try to pull out of Chile without a legitimate reason, the government will take us to court—and even if we win, the legal fees and damage to our reputation will kill us. You know that."

Fleetingly, Diaz's remark about economic imperialism flashed through Sommer's mind. Other nations undoubtedly felt that way, too. . . . and would likely be on Chile's side, no matter what atrocities the junta was committing. "I understand," he said. "But we still can't just sit by and let Soulminder be used this way."

Beside Van Proyen the intercom beeped, and the other bent to speak quietly into it. "I'm open to suggestions," Sands said. "If you can find a way to make *them* break or cancel the contract, we'll be out of there so fast it'll make your head spin. But otherwise . . ."

Van Proyen looked up, an odd expression on his face. "Dr. Sommer, the front desk reports that General Diaz is on his way back."

"Oh, *is* he?" Sommer said, starting for the door. "Good. I have some things to say to the man."

"Take it easy, Adrian," Sands called. "Don't do anything hasty."

"I'll talk to you later, Jessica," Sommer called as he yanked the door open.

"She's right," Compton's voice said quietly from behind him as he strode down the hall. "Bullying him isn't going to help."

"We'll see," Sommer said.

Diaz was waiting in the deserted anteroom just outside the Core entrance as he and Compton emerged. "Ah—Dr. Sommer—"

He broke off, his eyes hard on Som-

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mer's face as his own expression went tight and oddly sour. "I see," he continued, in a changed tone of voice. "So you've figured it out. And I can see you don't approve."

"I doubt that comes as a surprise," Sommer said evenly. "The game's over, General. As of right now."

Diaz's eyebrows lifted politely. "Or else . . . ?"

"Or else I'll pull Soulminder out of Chile. Forever."

The eyebrows remained lifted. "Indeed. I take it you're not overly familiar with the concept of specific performance?"

"I'm perfectly familiar with it, and I don't give a damn. No one will force us to continue operations here once this gets out."

Diaz smiled . . . and in that smile Sommer could see that his bluff had been a complete waste of time. "I beg to differ, Dr. Sommer," the other said. "When you lose the case—and you *will* lose it, because we've violated nothing in our contract—when you lose, then the courts will have no choice but to order you to fulfill the specific performance clause." Diaz's eyes hardened. "You can waste Soulminder's time and money, Doctor, and you can gain yourself a reputation for trying to bully small countries. But you can't stop us."

With an effort, Sommer unclenched his jaw muscles. "Why are you doing this?"

Diaz studied him, shrugged slightly. "It's very simple, Doctor. People whose lives have been miraculously spared are grateful. Grateful enough to devote a year of their lives repaying such a favor."

"At starvation wages, of course."

"As I said: grateful."

"And the pseudo-terrorist gambit? Or did you get the inspiration for that one from South Africa and Bulgaria and the others?"

Diaz's eyes flicked to Compton. "I see you've maintained your old CIA contacts," he said, a touch of bitterness in his tone. "As a matter of fact, no, that was our idea entirely. It occurred to us that perhaps that marvelous Soulminder gratitude might extend even to those who were critical of their leaders."

"And has it?" Compton asked.

Another flick of a glance. "Not as much as we'd hoped," he acknowledged easily. "That part is still being evaluated. Of course, the indenture by itself gives us the opportunity to put them somewhere out of sight for a year."

"In a place of your own choosing, of course," Compton pointed out coldly. "High-risk, if at all possible."

Deliberately, Diaz turned his attention back to Sommer. "What it ultimately boils down to, Dr. Sommer, is that everything we're doing—certainly everything that you can prove we're doing—is no more illegal or unethical than the things any other government does with and to its people."

"The world community might not agree," Sommer countered.

"And you plan to tell them?" Diaz asked blandly. "You're at liberty to do so, but I'd advise against it. There are far worse slaveries in existence in a dozen other countries, slaveries that don't draw so much as a spot on the evening news. And *we*, at least, make

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servants only from those who would otherwise have been dead." Abruptly, his gaze hardened. "Remember that, Doctor. What is a year of service to a man brought back from the dead?"

And in that moment, Sommer realized he'd lost. Diaz was right—there was too much of this sort of atrocity being committed in the world for the general public to take all that much notice of this one. If it hadn't involved Soulminder, Sommer had to admit, he might not have noticed it much himself.

But it *did* involve Soulminder.

"You don't need to drag us into it," he told the other, trying one last time. "People are effectively being brought back from the dead all the time—most major medical procedures being done today qualify as lifesaving."

Diaz shook his head. "You miss the point. Medical procedures can be done by anyone, in any place, and the fees for the doctors' work can be subsidized or forgiven by any of a thousand charitable organizations.

"But there is only one Soulminder. And in Chile, it's under *our* control." He favored Sommer with a brief, brittle smile. "The cradle is passé in today's overcrowded world, Doctor. It is now the hand that rocks the *casket* that rules the world."

For a long minute Sommer just stared at him, searching for a way to refute that. But he couldn't . . . and both of them knew it. "I'm going to stop you," he said at last. "Soulminder is mine, not yours, and I'll find a way to get it back from you."

Diaz shrugged. "Perhaps. Perhaps not." Taking a deep breath, he seemed to straighten up. "And now. If you're finished here, I'll be happy to drive you back to the hotel."

"We're not finished," Sommer said through stiff lips. "And send your car home—we'll find our own way back."

Diaz sighed theatrically. "There's no reason to be awkward, Doctor. One of my jobs at the moment is to act as your escort and liaison, and I intend to complete that job."

"Good night, General," Sommer said. Turning his back on the other, he stalked back through the security door into the Core.

Where, out of Diaz's sight, he paused, clenching his hands into painful fists as he swore the tension out of his chest.

Behind him, Compton slipped through the door to join him. "They're not going to get away with it, Frank," Sommer snarled at him. "They're *not*."

Compton's eyes were steady on him—eyes, Sommer saw, that had the same frustrated anger he himself was feeling. But under considerably better control. "Are you suggesting we interfere?" he asked quietly.

"You have a better suggestion?"

"Yes. Leave it to the Chileans themselves. People like Archbishop Manzano, who aren't afraid to speak out against the junta. They know what's going on, or will soon." Compton's cheek twitched. "The only way there's going to be any permanent change here is when the people decide it's time for that change."

"And how many slaves will they make before that happens?" Sommer demanded. "How many other countries will decide the junta's experiment is a success and initiate servitude projects of their own?"

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"And how many people will die when they revolt against the junta?" Compton added heavily. "It's not easy to sit by, Doctor, when people are hurting. But the quick fixes never really fix anything. Especially quick fixes from outside."

Sommer sighed. "You're right, Frank—we can't single-handedly make Chile over into the American dream. But Diaz was also right: there *is* only one Soulminder. . . . and no matter who has control over it locally, the ultimate responsibility for its use and misuse is still ours."

For a long moment he and Compton stared at each other, and it was Compton who finally nodded. "You'll want a surgical operation, then," he said. "Something that'll affect the junta's use or control of Soulminder and nothing else."

Sommer nodded grimly. " 'Surgical' is exactly the right word, as a matter of fact. Come on—let's get back inside. I need to find out from Van Proyen if what I've got in mind is feasible."

The last notes of the song ended, and for a moment the echoes reverberated through the cathedral. Sommer took his seat again, feeling his heart pounding in his chest. Archbishop Manzano would be speaking next. . . .

"I trust you realize," General Diaz murmured at his ear, "that the archbishop almost certainly won't be giving one of those fiery and impassioned speeches against the government which the international media so dearly loves. That type is usually reserved for when there are cameras focused on him."

"I understand," Sommer said between dry lips. "You're welcome to leave if you think it'll be boring."

He looked over to find Diaz glaring suspiciously at him. "Just what is it you expect to learn here?" he demanded in a harsh whisper. "That the archbishop is unsatisfied with the progress of our reforms? You know that already."

Sommer forced himself to meet the other's gaze. "Perhaps," he said, allowing his voice to carry just a bit, "I'll find out what it was he wanted to tell me a few days ago. When he called me at Soulminder and your people substituted an electronic mimic for his voice."

A few heads turned their way, and Diaz actually winced. "This is neither the time nor the place—"

"Shh!" Sommer cut him off. Archbishop Manzano had risen to speak.

Sommer's grasp of Spanish was far too limited to allow him to follow what the archbishop was saying, but from the very beginning it was clear that Diaz had been wrong on both counts. The archbishop's homily was as impassioned as any Sommer had seen on the evening news back in Washington—and its target was most definitely the junta.

Beside him, Sommer felt Diaz squirm uncomfortably in his seat. "The shoe fit too closely, General?" he murmured, not bothering to turn.

He could almost feel the heat of the other's glare. "Manzano's views are biased and distorted," the general all but spat. "All the truly thinking people in Chile know that."

Sommer opened his mouth to disagree—

And, without warning, the archbishop collapsed to the floor.

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For a half dozen heartbeats the cathedral was frozen into utter silence. Then someone screamed, and the sound broke everyone from their stunned paralysis. The crowd surged to its feet, a dozen men and women rushing up to the archbishop's assistance as the rest milled about in fear and uncertainty.

An uncertainty that was rapidly giving way to anger.

"Come on, Doctor," Diaz snapped, grabbing his arm in an iron grip and all but bodily yanking him out into the aisle and toward the nearest exit. The two soldiers Diaz had brought along were already ahead of them, forcing a path through the crowd, and with his free hand Diaz pulled out a small radio and began speaking rapid-fire Spanish into it. What Sommer could see of his face was an ashen gray.

One final press of the crowd and they were outside, and in the distance Sommer could hear the sound of approaching sirens. "This way," Diaz said, dragging Sommer toward the waiting limo.

"Wait a minute," Sommer objected, giving a totally useless tug against the general's grip. "We can't just run off and leave the archbishop like that."

"The ambulance is on its way," Diaz bit out. "The paramedics will be able to handle it."

"And if he dies?" Sommer demanded.

Diaz threw a razor-edged glare at Sommer. . . . but behind the anger Sommer could see a steadily growing tension. "Then you had better hope," he said, his voice quietly harsh, "that your Soulminder can restore him to life."

* * *

The ambulance crew had called ahead, and Sommer and Diaz arrived at Soulminder to find the Number One transfer room primed and ready. The general glanced around, strode over to where the head physician was checking the equipment and his instrument tray. "Well, Doctor?" he demanded. His tone, to Sommer, sounded less like a question than a challenge.

From the expression on the doctor's face it seemed he thought so, too. He gave Diaz a brief nod and then turned to continue his examination of the transfer equipment. "They seem ready to me," Sommer murmured.

"They had better be," Diaz said darkly. "Archbishop Manzano died before the paramedics even reached him."

Sommer felt his stomach tighten. "Did they get the neuropreservatives into him in time?"

Diaz put the question to the doctor, who responded with a shrug and an answer Sommer again didn't catch. "The paramedics claim they did," Diaz growled. "He says we won't know until the body is brought in. If you'll excuse me—" Without waiting for a reply, he moved away, circling the transfer table to make his own inspection of the setup. Sommer drifted back toward the door. . . . and was standing right next to it when there was a flurry of activity out in the corridor and Manzano's body was wheeled in.

Followed immediately by a dozen reporters and cameras. Diaz shouted something across the room and soldiers leaped in from the corridor, cutting through the crowd and forming a human barricade between the media and the transfer table. Diaz shouted something

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else and the soldiers began pushing the reporters back toward the door.

In the noise and confusion, no one noticed Sommer slip out.

Threading the Core's security gauntlet took three minutes, and by the time Sommer dropped into the chair beside Van Proyen, it was clear from the TV monitor that they were almost ready to begin. "Status?" Sommer asked, giving the duplicate readouts a quick scan.

"All the preliminary stuff's out of the way," Van Proyen told him, his voice tight. "They've got the glucose IV going, the curare's been neutralized and eliminated, and the process of flushing the neuropreservatives out of his system has been started. Another—" he glanced at the clock—"two and a half minutes and they'll be ready to try the transfer."

Sommer nodded, his eyes on the TV monitor. The transfer team, waiting for the neuropreservative flushing to be completed, stood silently around the body on the table. In contrast, Diaz, just visible at the edge of the screen, was a study in barely controlled nervous energy. "Anything from the media yet?" he asked over his shoulder.

Seated at another desk, flipping between channels on a muted television and holding a radio to his ear, Alvarez shrugged. "They know the archbishop took a curare dart," he said, his voice as tight as Van Proyen's. "*And* they know he was raking the junta over the coals again when he was shot. Nothing else but rumors . . . but the outside monitors show that we've got quite a crowd gathering around the building."

"Waiting for the archbishop to come out," Van Proyen suggested grimly. "You know, Doctor, this could get very nasty very quickly."

Sommer thought about the crowd back at the cathedral, about the anger he'd felt beginning to rise up within them. "How nasty it gets," he said, "is basically up to Diaz."

"I suppose." Van Proyen leaned forward, his eyes on the monitor. "Looks like they're ready.

Sommer leaned forward, too, mentally crossing his fingers. On the screen the doctor touched the master transfer switch; beside the monitor the duplicate readouts went from red to amber, and all eyes in the room turned to the body on the table.

Nothing.

For a long moment the doctor just stood there, staring with disbelief at the unmoving body. Then, abruptly, he and the rest of the team jumped back into action.

"My, my," Van Proyen murmured. "The soul didn't remeld."

"Shh!" Sommer snapped as Diaz took a step forward and snarled something vicious sounding. "What'd he say?"

"He's demanding to know why it isn't working," Van Proyen translated. The doctor snapped something back—" 'I don't know,' " Van Proyen added without being asked. " 'Be quiet and let us work.' "

Sommer felt his hands gripping the arms of his chair, and for a few minutes they watched in silence as the transfer team worked furiously to try and get the archbishop's soul to remeld with his body. But it was futile, and abruptly the duplicate readouts went from amber back to red. "They've given up," Van

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Proyen said as, simultaneously, the indicators for the life-support machines switched from standby back to full on.

Dimly, Sommer noticed that his teeth were clenched together. "They have to," he said, his mouth dry. "If they keep at it they'll only put unnecessary stress on the brain chemistry."

Reaching over, Van Proyen tapped out a command on a terminal keyboard. "The soul's back in the trap," he confirmed with a relieved sigh.

Sommer got to his feet. "I'll be in your office," he told Van Proyen. He gave the monitor a last look. . . . his eyes settling on Diaz. "Let me know when the general's ready to talk."

It took less than an hour.

"General Diaz wants to talk to you, Dr. Sommer," Van Proyen reported, his voice on the intercom sounding more than a little strained. "Are you ready?"

Sommer licked his lips. *As ready as I'm going to be.* "Ask him to wait in the conference room near the Core entrance," he said aloud. "Has Frank Compton returned yet?"

"Yes, sir, just a few minutes ago. He's up on the office floor, keeping an eye on that mob outside."

"Have him join us," Sommer instructed him. "Tell him to hurry—I don't want to be alone with Diaz."

He needn't have worried. Compton was waiting near the conference room door when he arrived. "Doctor," Compton said, his eyes tight. "You seen the crowd out there?"

Sommer nodded. "There's one forming around the Presidential Palace, too."

"And we're getting some rumblings of uncertainty from the military." Compton glanced back down the hall. "It's starting to look a lot like being in the middle of a revolution."

"It does, doesn't it," Sommer agreed grimly. "Everything's ready. Shall we go see if the general's had enough?"

Diaz was standing at the head of the table as they entered, his back unnaturally stiff. "Doctor Sommer," he nodded as Compton closed the door behind them. The general's voice was quiet, almost gentle—and it sent a chill up Sommer's back. "Tell me, what have you done to the Soulminder equipment?"

"Your own experts are out there, General," Sommer said, trying to keep his voice from trembling. This was it—the point on which Soulminder's entire future was wobbling. "Did you ask *them* what was wrong?"

Diaz's eyes bored into his. "You've sabotaged the Soulminder," he said. "Done something to it from in there." He nodded in the direction of the Core, the movement almost savage.

"Is that what you're telling the people outside?" Compton asked. "That your failure to bring Manzano back is *our* fault?"

Diaz's gaze moved slowly over to rest on Compton. "It was you, wasn't it?" he said, almost conversationally. "You who shot Manzano and made it look like the government was at fault."

Compton raised his eyebrows slightly. "The government? I thought it was left-wing terrorists who murdered people with curare darts."

Diaz raised his hand. "Not them alone."

Sommer swallowed hard. "And what exactly do you intend to do with that?"

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he asked, raising his eyes with an effort from the tiny air gun in Diaz's hand.

"You will restore the archbishop's soul to his body," Diaz ordered. "Now."

"Or else what?" Compton asked calmly. "You'll shoot us?—with both our Mullner traces on file with Soulminder?"

"Your souls may live on inside a box in Washington," Diaz snarled. "But your bodies would be here. Under *our* control."

"Wouldn't help you any," Compton shrugged. "Or haven't you heard of Arizona's Professional Witness program? Killing people doesn't guarantee you've shut them up anymore."

"Talk all you want," Diaz spat. "We *will* weather this crisis—the riots and Army trouble will be put down—and all nations suffering in the Soulminder stranglehold will thank us for what we've done."

Sommer shook his head. "No one will thank you," he said wearily. "All you'll accomplish will be to drive Chile into revolution. Your experiment in indentured servitude can't possibly be worth that price."

"And stopping it is worth the price of your death?" Diaz countered.

For a long moment Sommer eyed him in silence. Then, taking a careful step toward the gun, he pulled a chair out from the table. "Do you know why it was I developed Soulminder, General?" he asked, sitting down. "My motivation, I mean?"

"Is this some effort to stall—?"

"Twenty years ago," Sommer continued, "my son David, who was five years old, died as I was driving him to the hospital. The weight of that guilt stayed with me for eleven years, until Jessica Sands and I finally created Soulminder."

"I'm sorry for your loss," Diaz said, without any trace of sympathy in face or voice. "Forgive me if I'm not overcome by sentiment."

"I was the second person to go through Soulminder, General," Sommer told him. "I've been in the tunnel. . . . I've seen the Light that waits at the end of it."

"Religious superstition," Diaz sneered. "For the weak and the gullible."

"Perhaps," Sommer said. "Perhaps not. The fact remains that I'm not afraid to die . . . and you are."

The knuckles of Diaz's gun hand whitened noticeably, and his eyes flicked to Compton. "What about you, CIA man?" he spat. "Are you ready to die, too?"

"Curare's a fast way to go," Compton said evenly. "Much faster than being torn apart by the mob outside."

Diaz smiled at him. "The mob can do what they like with this body. There are hundreds to choose from." He looked back at Sommer. "Or hadn't *that* potential of your Professional Witness program occurred to you?"

"It's occurred to us, yes," Sommer told him evenly. "But it won't work for you."

Diaz snorted. "Why?—because of the so-called biochemical instabilities involved in transferring a soul to a different body?"

"No," Sommer said. "Because your Mullner trace is no longer on file with Soulminder. I erased it half an hour ago."

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Diaz stared at him, some of the color draining from his face. "You're lying," he said, his voice barely above a whisper. "Bluffing. You wouldn't do something like that."

"You have two choices, General." Slowly, carefully, Sommer pulled a sheaf of papers from his coat pocket and laid it on the table. "Choice one: you can take this amended contract to the Presidential Palace and have General Santos sign it. It has a clause expressly forbidding any form of servitude as the price for Soulminder access, under penalty of complete cancellation if violated. And believe me, we *will* monitor your compliance of that clause.

"Choice two—" he took a deep breath—"is to call my bluff."

There was hatred in Diaz's eyes. Dark, blazing hatred, both for Sommer himself and for the legacy of economic domination of which, in his view, Soulminder was just one more example. For a half dozen heartbeats Sommer wondered if he'd pushed the man too far, wondered if pride alone would now force him to kill and then die in turn.

And slowly, almost reluctantly, the gun barrel dropped to point at the floor. "I will take the contract to General Santos," he said bitterly. "I will also announce that you have taken charge of Manzano's revival. From now on any delays will be upon *your* head."

"Understood," Sommer nodded, a wave of relief washing over him. Relief . . . and a strange sadness. "You might inform General Santos that he and the other members of the junta have also been erased from Soulminder's files. In case that has any bearing on his decision."

For a moment the two men locked eyes. Then Diaz reached down and picked up the amended contract. "This was a battle, Dr. Sommer," he said, very quietly. "Not the war." Without another word, he strode from the room.

Sands shook her head, lips pursed tightly together as she hefted the new contract. "That was, without a doubt," she said, "the noblest damn fool thing you've done in years."

"You'd have preferred letting the Chilean government perfect this new brand of slavery?" Sommer countered.

"To you meddling with their politics?" Sands snorted. "As a matter of fact, yes, I *would* have preferred it. My God, Adrian—you all but assassinate an archbishop, and then compound the risk with that crazy IV trick. What if one of the doctors had tried switching glucose bottles?"

"It wouldn't have mattered," Sommer said, walking over to his desk and sitting down. Suddenly, he was very tired of having to think and talk about Chile. "All the bottles available to them had the same lacing of neuropreservative, and with that continually dripping into the archbishop's system they didn't have a hope of remelding his soul."

Sands eyed him. "Don't get me wrong," she said, a note of caution creeping into her voice. "I don't quarrel with your motives—I realize you had the best interests of the Chilean people in mind. But it sets a dangerous precedent."

"What, that we want to maintain control over how our invention is used?" Sommer demanded pointedly. "That's hardly a dangerous precedent."

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She gave him a patient look. "Look, Adrian, we're not set up here to function as the world's policeman. As long as there are warped and power-hungry people in high places, there'll always be attempts to pervert Soulminder into something we don't like. Diaz was right—we've won a battle, not a war."

Sommer shook his head. "Diaz was wrong . . . and he knew it. We've won the war, all right."

"Because the junta wasn't willing to risk death over their servitude project?"

Sommer gazed at her, a strange melancholy tightening his stomach. "You're missing the point, Jessica," he said quietly. "Diaz and the others were generals. *Military* men, who'd probably faced the prospect of death dozens of times throughout their careers. And yet they caved in when they found I'd erased them from Soulminder. Why?"

Sands's eyes were steady on him. "You tell me."

"Because they'd gotten used to the idea that they could be immortal," he sighed. "They saw themselves living forever. . . . and they weren't willing to risk that."

For a long minute Sands was silent. "If that's true," she said at last, "it means Soulminder has suddenly inherited a great deal of political muscle."

Sommer nodded. "I'm not at all sure I want us to have that kind of power."

"I'm not at all sure," Sands said quietly, "that we have a choice." ■

Editor's Note: This story is part of the author's "Soulminder" series, which began with "I Pray the Lord My Soul to Keep" (January 1989).

●The obscure we see eventually. The completely apparent takes a little longer.

Edward R. Murrow

●The obscure a bureaucrat may see eventually. The completely apparent takes forever.

John Hradsky

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The Alternate View

TECHNOLOGY RE-TRANSFER

G. Harry Stine

The best way to learn how to effectively fight your enemy is to know and practice against your enemy's weapons and weapons systems. If you can't get the enemy's weaponry, you try to simulate it as best you can by using some of your own that might closely match his. Then you assign the "enemy" gear to a group of your own crazies, let them practice with it for a while, then hold a "war game" to see who wins and why.

Beats the hell out of going to war in the first place in order to find out.

One of the most popular motion picture films of the 1980s has been *Top Gun*. I enjoyed it because I grew up in the days of World War II when most aviation movies were then-versions of *Top Gun*. (In short, *Top Gun* was a standard 1939 aviation movie with the serial numbers filed off and jet fighters used in place of P-39s and P-40s.) *Top Gun* introduced the American public to the US Navy's Fighter Weapons School known as "Top Gun," conducted as a "graduate course in fighter weapons and tactics" for Fleet and Marine Corps fighter aircrews twice a year at Miramar Naval Air Station near San Diego, California.

The US Air Force has a similar but slightly different production called "Red Flag" that takes place at Nellis Air Force Base, Las Vegas, Nevada.

Both activities came about as a result of the horrible losses that occurred when American pilots with the world's best technology tangled with Soviet aircraft and Soviet-trained pilots in Southeast Asia. American pilots were great on formation flying but terrible when it came to the fighter tactics proved out in World War I by Oswald Boelcke. "Flying around the flagpole" in order to accumulate the required number of flying hours every month doesn't necessarily make the world's greatest fighter pilots. And it was a hard lesson to learn.

The objective of both Top Gun and Red Flag is to allow USN and USAF fighter pilots to come up against aircraft that perform like those of the USSR and pilots who've studied and practiced fighter tactics used by the Soviets.

It's easy to get the Soviet military manuals. A book store in Washington D.C. is a great source. And several Soviet pilots have voluntarily made their homes in the United States and therefore became valuable "consultants" in the process.

But duplicating the size and performance of Soviet aircraft wasn't easy.

Painting a Northrop F-5F black and putting red stars on it doesn't make it a MiG-21 although it's about the same size and has about the same combat performance. (The wingspan of the MiG-21 and the F-5F are about the same, and both are less than the *tailspan* of the McDonnell Douglas F-15, the "flying tennis court" which is probably the world's best dogfighting aircraft, an appellation that F-16 and F-18 pilots will dispute.) Numerous American and Israeli aircraft—A-4s and Kfirs ("F-21s"), for example—have been pressed into

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use as "aggressor aircraft" sporting Warsaw Pact paint schemes (but American military insignia).

However, it was once difficult to get Soviet aircraft. Or we thought so; we just didn't have patience. The delivery of a MiG-15 by a defecting North Korean pilot during the Korean War netted the pilot a cool $100,000 reward— and that was when $100,000 was real money that would buy a lifetime of luxury amongst the imperialistic capitalist running dogs. The USAF offer to return the MiG-15 to its rightful owners was ignored, so it sits today in the USAF Museum in Dayton, Ohio.

Then suddenly in about 1985, MiGs and other goodies began turning up in America.

The first MiG-17 I saw west of the Iron Curtain is on display at the Champlin Fighter Museum in nearby Mesa, Arizona. Doug Champlin, a wealthy oil man with a hobby of collecting fighter airplanes, bought it from the government of Morocco.

In a military magazine, I noticed a run-down of the USAF equipment which included the usual raft of F-4s, F-15s, and F-16s . . . plus a cryptic series of entries indicating MiG-19s, MiG-21s, and MiG-23s in squadron strength! Soviet aircraft flying in the USAF! Where did they get them?

The United States is paranoid about technology transfer to the Soviet Union. The reason is simple. As one aerospace engineer recently remarked, "The best Soviet design bureau is the American aerospace industry." But the difficulty of tech transfer was working both ways: We couldn't get any Soviet stuff, either. Then the United States government discovered "technology re-transfer."

The Israelis captured a *lot* of Soviet armor, weapons, and aircraft during the Yom Kippur War. Egypt broke free of the Soviet sphere and we got a *lot* of Soviet aircraft and other equipment from the Nile Valley.

Pre-dating *glasnost* by several years, the governments of Poland and Hungary suddenly began selling their obsolete Soviet military equipment to collectors and arms dealers in the West.

A space advocate friend of mine and SF reader, Karl Pflock, has turned up as deputy director of something called the Department of Defense Operational Test and Evaluation Office. He's in charge of America's "Soviet Air Force," among other things. Turns out that the three grey MiG-17s I saw parked at Albuquerque International Airport (which is also Kirtland Air Force Base) belong to this outfit and were part of a three-week "threat test" in New Mexico where Air National Guard pilots flew American A-7s against them and against Russian-designed and Chinese-built tactical early warning radar systems. The DoD "air force" includes MiG-15s, MiG-17s, MiG-21s, MiG-23s, An-2s, Il-14s, and Mi-2 helicopters, often in several different models. In a newspaper interview, Pflock admitted that advanced Soviet aircraft and weapons systems are still obtained "through the customary government means" but that a lot of them come from private aircraft and arms dealers.

Then MiGs began turning up at Reno, Nevada and Chino, California.

They're for sale to anyone who wants to plunk down $150,000 for a flyable

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MiG-15, MiG-17, or MiG-19 with spares. (A North American F-86 goes for about $250,000. And a fully equipped, brand-new Piper Archer, a single-engined private plane, will set you back about $150,000, batteries included, no assembly required.) This was a deal! A couple of warbird fanciers ended up with MiGs replete with Soviet markings. One of them was based for a time near Pensacola, Florida until the United States Navy quietly suggested to its owner that he move it elsewhere lest some trigger-happy Navy F-14 Tomcat jocks get excited while seeing it near the Navy's Military Operations Areas one day.

This has also been a boon to aviation museums who have longed for examples of significant Soviet aircraft.

But where you buy your MiG is important if you want to keep it. . . . as Ed Mahoney of the "Planes of Fame" museum at Chino Airport in California found out.

Mahoney acquired a MiG-15 and a MiG-17 from Poland. He may have to either destroy them or give them to the United States government. Although the aircraft were purchased through a legitimate Los Angeles aircraft broker and were cleared by US Customs, the Bureau of Alcohol, Tobacco, and Firearms of the Treasury Department has informed Mahoney that his airplanes are not in the United States legally because they were purchased from an Eastern European country with whom economic dealings of this sort are "proscribed." If he'd purchased them from the People's Republic of China, he would have had no problems.

SF author and aerospace writer Martin Caidin once owned a German Junkers Ju-52 "Iron Annie" built in Nazi Germany. Now he's looking for a Soviet An-2, the world's biggest and ugliest biplane. He can't get a new one from Poland where they're currently being manufactured; he's going to have to try to buy a used one from the USSR!

At this time, the Soviets are actively marketing their Yak-40 commuter jet transports through US companies, a Soviet automobile is about to be introduced into the US market, and you can buy all the Polish hams you want. But you can't buy a MiG jet fighter from Poland in spite of the fact that the United States government itself is the biggest purchaser of Soviet-built aircraft from Eastern Europe!

Technology transfer: It appears to be a one-way street right now. It might be nice to know and a boost to one's technological ego to find out what's being stolen from you and how it's being adapted by other engineers.

Technology transfer: The Champlin Fighter Museum just got its McDonnell Douglas F-4 Phantom-II. Sure, it's 1950s technology. But the Soviets had trouble matching it with the 1975 MiG-23. Now all they have to do to really find out is visit Mesa, Arizona with a camera, a notebook, and a measuring tape. . . .

Someday we may realize that technology knows no country and begin to follow the advice of the hero of Rudyard Kipling's poem, "The Mary Gloster":

They copied all they could follow, but they couldn't copy my mind.

So I left 'em sweatin' and schemin', a year and a half behind. ■

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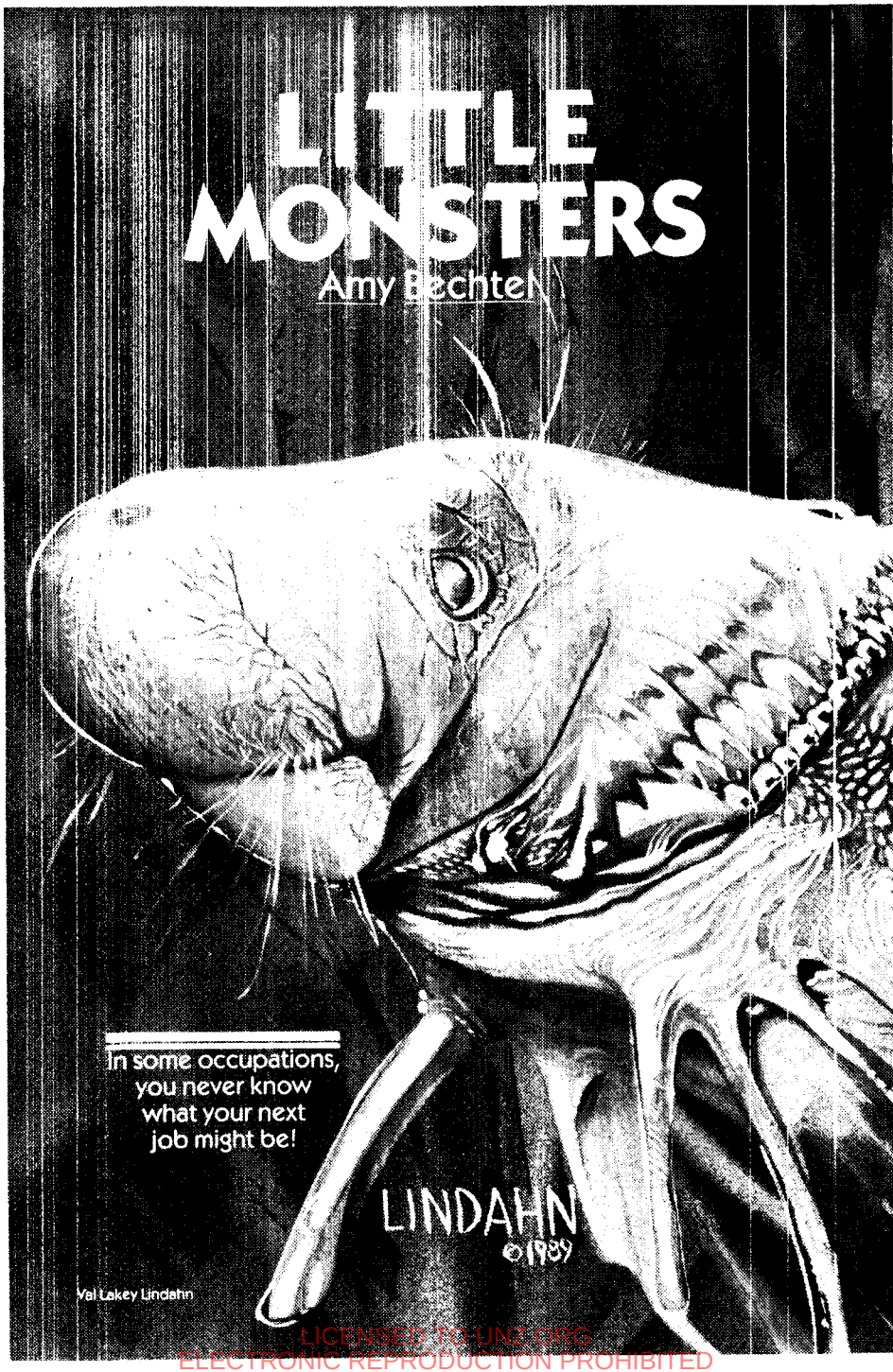

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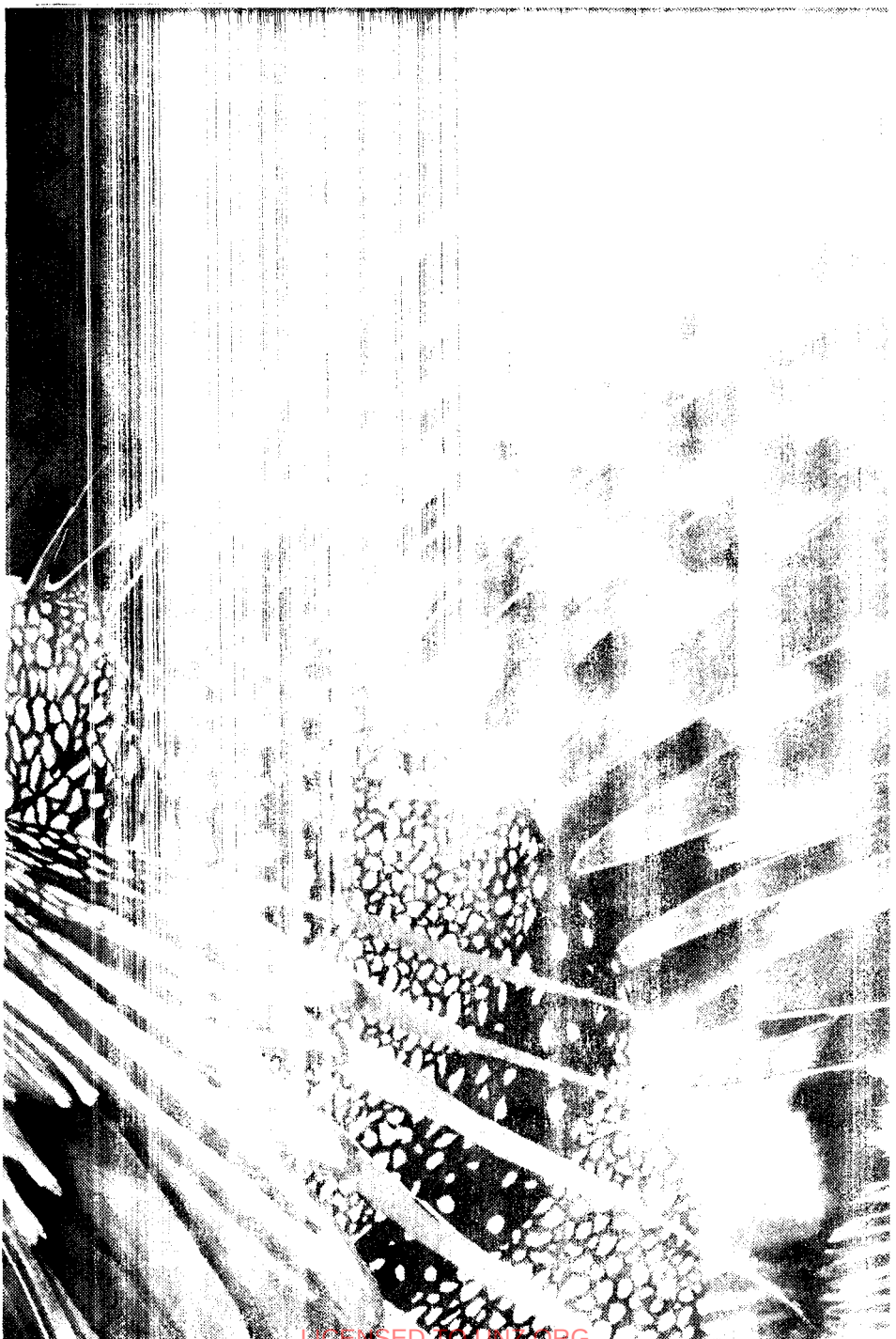

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Howard Winston didn't bring a turtle with him on Tuesday. He brought hermit crabs.

"Hermit crabs?" I asked Lynda, the secretary, and looked up from the cat I was working on. "Are you sure? He always brings turtles."

"How would I be sure? He's holding an aquarium. He says it's got hermit crabs in it. I'm not planning on looking that close."

Lynda went back to the waiting room. I finished neutering the cat (the woman who owned him had been very shy about what was to be done; finally she'd whispered to me that he had to have his naughty bits removed) and contemplated changing the sign out front. Underneath DESERT SPRINGS ANIMAL HOSPITAL—MICHAEL CLAYTON D.V.M., I could add NO CAMELS, OSTRICHES, OR HERMIT CRABS. I mean, let's face it: in vet school I made a "D" in exotic animal medicine. I slept through all the kitty cat and poodle courses. Unfortunately in this town you can't make a living off cattle and horses, so I went back and learned all the cat and dog stuff, and I do a fair job, but I'd rather be out by the cattle chutes any day. How had I ended up with a devoted client like Howard Winston? What could possibly be wrong with a hermit crab?

I had gone through about twenty of the books in my office, frantically searching for any reference to hermit crabs, when Lynda stuck her head in.

"They're stacking up," she said.

"Give me a list."

"There's a lady dropping off a dog spay for tonight. And a mastiff with a foxtail in the ear; the owner says he bites. And then there's one you'll like."

"One I'll like?"

"Yes. An incredibly beautiful girl wearing very little in the way of clothes. She's carrying a box and says she has a chihuahua in it, but she won't tell me what's wrong with it."

"Incredibly beautiful?" For a moment I forgot about hermit crabs.

"Howard is first," Lynda reminded me.

"Stall him, would you?"

"No problem." She smiled, and left. Lynda and Howard may be a hot item sometime, if they ever get beyond the stage of staring moonily at each other. Howard teaches literature and poetry at the junior college, and once, Lynda told me, he had a poem published. "A real *poet*," she'd said. "Imagine." But so far all of their conversations have been along the lines of "What's your turtle's name?" and "How old is he?" and "What is he here for?"

Finally I found hermit crabs and read Husbandry, Common Medical Problems, and Treatment. Armed with my new knowledge, I hurried to the front and called Howard in.

"Sorry to keep you waiting," I said. "I had an emergency."

"Oh, no problem," he said, and he meant it: he's the calmest, mildest man I've ever met. He's quiet and shy and starting to go bald, and he wears glasses, but there is a subtle elegance about him (maybe it's the poetry) and judging from Lynda, there is no question that he is attractive to women. He placed the aquarium on the table in front of me. There were five odd-looking creatures wiggling about inside it.

"Hermit crabs?" I said, feigning surprise. "No turtles?"

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"The turtles are all healthy today. These guys look like they have some kind of parasite. See?"

Blessedly I had just finished reading about this parasite, and I treated the crabs with confidence, as if I'd been treating crabs for years. Howard was impressed. He was always impressed, for some reason, and would no doubt keep coming to me forever, which was unfortunate, since his pets kept getting more numerous and more *exotic*.

"Max is doing well," he told me. "He feels great. He's chasing the girls all over the place. We'll have lots of little tortoises this year."

Howard always mentions Max when he comes to see me; Max is his favorite pet. *I* still can't believe I stayed up all night, a year ago, for the sake of a single desert tortoise.

Max is a big tortoise, twenty pounds or so, thirty to forty years old, but that didn't help him when the pack of coyotes got hold of him. They chewed him up something fierce, leaving puncture wounds all over his neck and legs and even under his shell. I got all the visible wounds cleaned and soaked in iodine, and stopped the external bleeding, but I couldn't stop the *internal* bleeding, or even figure out what was going on inside that shell. I gave him fluids and kept him on antibiotics, but what he really needed was blood. Only how was I going to give him blood? Where would I find a donor tortoise? If I found one, where would I find a vein? Finally, as the days went by and Max got paler and paler and weaker and weaker, I called a hot exotic specialist in L.A. (this guy's so hot a phone consult costs thirty-five bucks; it *hurt* me to make that call) and asked if he had any ideas. He said he'd call me back in an hour. I know what *that* means; it means he had to look it up. He called back and said, try Winstrol-V. Fine, I said; what's the dose? He laughed (chuckled really) and said, "Your guess is as good as mine."

When I was in school I ended up with an ostrich for a patient. *Me*, the exotic-phobe. I was thrilled, let me tell you. I was supposed to anesthetize this ridiculous bird, which outweighed me by fifty pounds and had the capability of disemboweling me with a single kick. I went to the head anesthetist and said, "Sir, how do I monitor the depth of anesthetic on this ostrich?" (Knowing that if the bird woke up on the table and killed someone, or if it croaked, I'd be in big trouble). The anesthetist smiled at me, chuckled, and said, "Son, your guess is as good as mine."

After Howard left with his crabs I checked in the dog spay, got the foxtail out of the mastiff's ear without getting my face bitten off, and finally (ah, reward time!) I got to see the Beautiful Girl. She wouldn't tell me what was wrong with her chihuahua, and blushed deep scarlet when I asked. I hadn't seen anyone blush like that in a long time; I made the diagnosis off the blush, and I was right. Paraphimosis, which is to say, the little guy got it up, and he couldn't get it down. His penis was red and purple and swollen; looking at something like that is more painful than doing castrations, but it's usually easy to fix. I told the Beautiful Girl to come back in a couple of hours and we'd have her little chihuahua just as good as new. She was terribly impressed when she picked him up. Now *her* I didn't mind

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impressing. She could call me at midnight any time.

The phone did ring at midnight, but it wasn't the Beautiful Girl. It was Howard Winston.

"I'm sorry to wake you," he said, "but I have a serious problem here."

"Mmph," I said. "What is it?"

"Well it's hard to explain. I need a house call."

"House call? Why do you need a house call? Bring it down to the clinic."

"I can't."

"Why the hell not? You brought the unicorn down to the clinic."

"It fit in the horse trailer."

"You brought the purple cow to the clinic."

"It fit in the stock trailer."

"You have something that won't fit in the *stock* trailer?"

"I'm afraid I do."

"Hell. What is it?"

"A sea monster."

"I don't do sea monsters," I said. I'd have to add that to the sign, right under NO HERMIT CRABS.

"I don't think anyone else does either. *Please*, doc."

"Look, you can stop kidding around. What do you really have?"

"A sea monster."

"Howard, we're a hundred miles from the ocean. In the *desert*."

"I know, but I don't know what else to call it. Doc . . . I know I've ragged you before, about the unicorn and all, but this time I'm dead serious. I have a very sick sea monster here and if you don't come and see her she's going to die."

The last time Howard sounded like that was when Max was hurt. I gave up.

"Tell me where you live."

"At the end of the road up Caliente Canyon."

Fifty *miles*. I said something very impolite about sea monsters, snagged a bottle of NoDoz and my *Aquatic Medicine Handbook* (from Exotic Animal Medicine, in which I'd made a "D") and headed for the truck.

It was an awful drive. At the top of the canyon the road is rough, full of potholes, half paved and half not, and it makes lots of disconcerting hairpin turns alongside bottomless cliffs, with (of course) no guard rails. It isn't the best sort of road to drive while you're asleep. I tried to keep myself awake by figuring what Howard *really* had up there. I remembered the unicorn very well; it was the first time I met Howard. He walked in, very quiet, shy and polite, not looking the least bit like a practical joker, and said in his soft voice, "I have a unicorn to be dehorned. He's out in the trailer."

"A unicorn," I said.

He nodded.

"Well . . . bring him in."

Howard did so, and damned if it wasn't a unicorn. It was a bay colt, two years old and without a lick of sense; he'd run full tilt across his pasture and straight into a tree. A branch had caught him between the eyes, bounced off his skull, and come out behind the left ear; it looked for all the world like those pictures you see of unicorns, except for the splattering of blood and the bits of skull around the horn. I spent an hour picking the pieces of branch and bone out of the wound, and another two hours suturing the mess. When I was done, the colt had a hell of a scar, and even

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less sense than he'd started with. But Howard was impressed.

He brought the purple cow a month later. It was really a blue roan, but it *looked* purple, and it had a purple calf (once we got all the birth slime off) which I delivered by C-section. I remember that one because it was 4:00 A.M. and I was tired, and about halfway through suturing the endless abdomen I ran the needle all the way through my hand. I still have some interesting scars.

Howard was waiting to open the gate for me when I reached his place. He closed the gate behind the truck and climbed into the cab with me, looking worried and apologetic.

"Where to?" I said.

Looking even more apologetic, he pointed to a road that was so faint it could barely be seen, and what *could* be seen looked like it went straight up.

"It's only a mile," he said. I politely offered to let him drive, since he was more familiar with the road; he shrugged and changed places. The crashes and bangs from my poor truck soon made me wish I was driving after all; Howard might know the road well, but he was too distracted to give it much attention. I held on to the dashboard, and tried not to look out the window.

"There's water up here," Howard said. "You'd be surprised what's hidden up these canyons. Springs, ponds, creeks . . . the hills all seem so dry, but there's water if you know where to look."

"There's water, sure, but how much?" I said. "Enough to support a trout, maybe. Or a guppy."

Howard shook his head firmly, and swung the truck around a hairpin turn. He said, "This place is different. It looks like it's just a pond, maybe spring fed, but it goes down. Down deep. A few months ago I got some new scuba gear and wanted to try it out on my pond. I couldn't see the bottom—I thought I'd dive and find out how deep it was. Only I never found the bottom. The water keeps going, down and down, I don't know how far. Under these hills there're caverns and chambers full of water, all connected to each other; they must spread out for miles. I found the monster down there. And she followed me when I went back up."

The road disappeared altogether, and Howard brought the truck to a grinding, jolting stop. We got out of the truck. The lights of the city were far away, far below, and here in the hills the starlight drowned them out. The Moon was half full. Howard hefted a flashlight, and I got out my own, and we walked about fifty yards to Howard's pond.

It might have looked ordinary by day, but the moonlight, and Howard's story, made it seem mysterious. I stood on the bank, looking at the water, wondering if the ground I stood on was really balanced precariously atop a vast watery cavern. There was no sign of a sea monster. I looked at Howard.

"She must have gone down. I'll call her back," he said, and I nodded, as if it were perfectly normal to call sea monsters out of the depths. We knelt by the rippling, moonlit water. Howard reached out and tapped the water three times, then again, in a distinctive pattern.

Bubbles rose from the depths, the water roiled, and I stepped back in alarm as the sea monster surfaced. Howard

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stroked her, and she moved toward him feebly, resting her flukes on the edge of the pool. It *was* a sea monster, and there *was* something seriously wrong with her. She moved very slowly, drifting, and you could see her backbone clearly; her sides were caved in beside it, hollow. I had never seen a normal sea monster but I could tell that this one was emaciated. I moved back beside Howard, and knelt.

The sea monster's flukes weren't just flukes; they had appendages, little tentacles, almost like fingers. Howard put his hand in her fluke and gently pulled, urging her out of the water. She came willingly, but slowly, painfully, until she had dragged herself all the way out onto the bank.

She was *big*, as big as five or six dolphins put together. She had a blowhole like a dolphin, and she made clicking sonar noises like one, but her head was more like a manatee's, ugly at first sight, with wrinkles and a few whiskers. There were gills behind the whiskers. Her dorsal fin had fingers; it waved in the air like a sea anemone. Her tail divided into four separate fins. Her body was not the least bit streamlined; she was almost spherical, like a cross between a giant dolphin and a giant octopus.

"She can stay out of the water for a while," Howard said. "So you can examine her."

"How do you know she's a she?"

"She has babies."

Howard touched her side, and she rolled obligingly away from him, belly up, revealing a pouch. She was a marsupial as well, a dolphin crossed with an octopus crossed with a kangaroo. Howard reached into the pouch and came out with a squirming baby sea monster (an exact miniature duplicate of the mother) which fit perfectly in the palm of his hand. He showed it to me, then put it back in the pouch. "There're ten of them," he said. The sea monster rolled onto her side and pushed a fluke into his hand, and he clasped it gently. "She's scared, and she feels bad, but she's ready. Go ahead and have a look at her, doc. I call her—well, I call her Nessie."

Howard continued to hold Nessie's fluke while I went over her from whisker to tailfin. I didn't know what I was looking for, but I examined her like I would anything else. I opened her mouth and checked her teeth and the condition of her gums. I checked her blowhole, her skin, her appendages, her urogenital opening. Nothing was obviously abnormal, except for how thin she was.

"She had a mate," Howard said, "up till a month ago. He died all of a sudden; wasn't sick at all that I could tell. I came to see them one day and he was half on the bank, dead. Nessie was going crazy, trying to get him to move and all. I had an awful time getting the body out. I had to use the flatbed and a winch. Couldn't let anybody else know they were here."

"Howard, has she always been this thin?"

He looked at her critically. "No," he said, "but I hadn't really noticed till now. She only just seemed sick tonight, for the first time."

"Is she eating?"

"I don't know, doc. She eats down

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deep. Down in the underground water, where there're fish. I never see her eat."

"Vomiting? Diarrhea?"

"Not that I've seen. But I might not know."

I hardly knew what else to ask. There was almost nothing to go on. "Howard," I said, "do you have *any* idea where Nessie came from?"

"She came from down below." He pointed down.

"But how did she get there?"

"I'm not sure, but—" Howard disentangled his fingers from Nessie's fluke and began to slosh water over her gills; Nessie made a clicking noise that might have been pleasure or relief. Howard said, "But last year I was in the upper canyons, backpacking, and I found a puddle. Just a little puddle of dirty water that looked like it would evaporate in a day or two. And there was a fish in it. A *big* fish. It didn't quite fit in the puddle any more, but it was still alive. You could tell that there used to be a big pond there, big enough for the fish, but it had been an awfully dry year." Howard slipped one hand back into Nessie's fluke, and with the other hand made a broad gesture at the surrounding desert. He said, "There used to be an ocean here."

I sat very still for a moment, looking out at the hills, and the plains beyond, all of which had once been under water.

Howard said, "Do you need to examine her any more?"

"No. Let her go back in the water," I said. He pushed at her fluke, guiding her back, and she seemed to sigh with relief as she slid into the water. She lay there with just her eyes and blowhole above the surface, watching me as if waiting for an instant diagnosis. For once I didn't feel like pretending. I went to the pickup, pulled out *Aquatic Medicine*, cracked the door so the interior light would stay on, and started reading. I read for a good half hour, while Howard sat on the bank of the pool, giving Nessie an occasional gentle touch. I read about dive reflexes and blood shunts and the flexibility of the thorax under pressure. I read about external parasites and internal parasites and diseases characterized by diarrhea or constipation and diseases characterized by skin lesions and ulcers in the mouth. I read nothing whatever of any use.

I put the book down. Howard looked up at me and whispered, "What's wrong with her, doc?"

He really thought I would know. I had to admit it. "I don't know," I said. "Howard, I haven't got a clue. This is way out of my league."

"But it's serious, isn't it?"

"Yes. That much I can tell. Look, maybe in the morning I can get hold of someone who does this kind of thing. I mean, there're vets who work on dolphins, stuff like that. At least that's closer. Maybe somebody like that could figure out what's wrong."

"No," Howard said. "No, she doesn't want that. No one but you. If a specialist found out, even if they could save her they'd want to take her, and study her. *And* the babies. I know you can figure out what to do, doc."

The first rule in all medicine is First, Do No Harm. How would I know what would harm a sea monster, what would help one? They were both looking at me, pleading, and I said helplessly,

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"Let me get a blood sample. Maybe that will tell me something."

"OK," Howard said. "Where do you get the blood from?"

Aquatic Medicine said that in dolphins, you take it from the ventral vein between the tailfins. It was worth a try. I got a syringe and needle and some tubes, and Nessie obligingly hauled herself out of the water, and rolled onto her back. I pulled her four-pronged tail into my lap and started feeling for veins. Nessie was trembling. The book said trembling was a very bad sign, at least in dolphins. Nessie had no vein where dolphins had one, but I finally found one nearby, and drew the blood. It looked like any other animal's blood. I put some in a clot tube and some in a lavender-top, and stowed the tubes safely away. Nessie crawled back into the water, and Howard asked what he could do for her in the meantime. I didn't know. I told him to stay with her, and give her TLC. Maybe it would help. Not likely, though.

I took the clot tube straight to the hospital lab and asked for a stat panel; the night tech was grumpy about it but said she'd do it as fast as she could, which meant she'd do it as soon as all the routine non-emergency human stuff was finished. "Cat or dog?" she said, and I said, "Dolphin," and judging from her reaction to that, it's a good thing I didn't say sea monster. I took the lavender top tube to my clinic to run the CBC myself. Human labs tend to freak out when the blood cells start to look different, and anyway I wanted a look at the cells myself.

By 8:00 A.M. I had all the results in. But what did I have? What was *normal?* I hunted for a while and finally found the dolphin normals. Nessie's results weren't even close to dolphin normals. But was that good, bad, or indifferent?

Her liver panel was way out of the usual range, high enough to indicate severe hepatic disease in a dog or cat (or dolphin). But what did that mean in a sea monster? Perhaps a liver biopsy was indicated, but where was Nessie's liver? Could I biopsy it without killing her? Did she *have* a liver? Suppose I found it and biopsied it and found liver disease; what then? How would I treat it? I thought about phoning the thirty-five buck a call specialist in L.A., but Howard said Nessie didn't want that, and anyway if he had to look up what to do for a desert tortoise, he wasn't likely to be much help for a sea monster. I had Lynda cancel my morning appointments, and drove back up to Howard's place. Maybe it was old age. Maybe it was stress due to nursing ten babies in her pouch. Maybe if I *looked* at Nessie long enough, a light bulb would go on.

I found Howard still kneeling by the pond, holding Nessie, and I knew then that it was already too late. Even sea monsters have agonal gasps just before they die. Nessie was wheezing; horrible choking sounds came through her blowhole as her body, already committed to dying, made its final useless fight.

"Help her," Howard said. "Do something."

"I can't," I said. "There isn't anything I can do."

"But you're a doctor! You have to be able to do something!"

"I'm sorry, Howard. God! I'm sorry."

We sat with Nessie while she died,

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and then I got up, feeling very stiff and very tired. I went to my truck and got a bucket out of the back. I filled it half full with rippling water from the pond, and I took a baby sea monster out of the pouch and put it in the bucket, where it swam curiously in circles, spouting a spume of water through its blowhole. I had put five more in the bucket before Howard finally let go of Nessie's fluke. He took the bucket from me, and put the last four in.

We got the flatbed and the winch and with a lot of effort (and some tears) we got the body out of the pool and loaded onto the truck. Howard said he was going to have to rent some equipment to dig the hole to bury her. He drove the flatbed over a rise, where he wouldn't have to look at what was left of Nessie, and then he came back and picked up the bucket and stared at the ten curious, concerned little monsters.

"What'll I do with them?" he said suddenly. "I mean, they're helpless! They're still nursing. What'll I *do*?"

"They'll be OK till tonight," I said. "I'll bring you a formula for them. I *promise*."

He nodded, dazed, while one of the monsters climbed onto his hand and started sucking on his fingers, looking for milk. I squeezed Howard's shoulder, got in my truck, and drove to town. I had to stop by the flatbed on the way down, and it was a hell of a chore, shoving my way into the pouch (already smelling rank) to find the teats and get a sample of the milk. I'll have to call in some favors, and go into debt on them, and even so I'll be lucky to get a full analysis of the milk by next *week*. I don't think the babies will live that long. But I've made formula for foals, and calves, and puppies and kittens; how much different can baby sea monsters be? I'll figure it out; my guess is *better* than anybody else's.

The sea monsters won't go hungry tonight. ■

●Physical concepts are free creations of the human mind, and are not, however it may seem, uniquely determined by the external world.

Albert Einstein
Submitted by John Hradsky

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By the summer of 2044, present-day mechanical technology had been largely replaced by products of gengineering. The Gilman family drove a Tortoise. Other people drove various Buggies (e.g., Roachsters), while airplanes and helicopters had been replaced by gengineered (and skeletally reinforced) birds equipped with jet engines. The largest of these "jets" were the size of 747s; the smallest were comparable to Piper Cubs.

It was one of the latter, a Chickadee, that five-year-old **Andy Gilman** *pointed out to his father* **Nick** *as they were preparing to fetch their mother and wife* **Emily** *from the airport. The Chickadee was eating small, wild birds. Emily, a gengineer, had been in Washington trying to expedite the patent for the Bioblimp she had been developing from jellyfish. Once the family was together again and on the way home, however, a Palestine Airways Sparrow landed on the highway and began to gobble Buggies. Clearly, the Chickadee had been an omen.*

The Gilmans sheltered safely in their hard-shelled Tortoise until the police arrived in their Sparrowhawks to kill the Sparrow, clean up the carnage, and get traffic moving again. Among the police officers were detectives **Bernie Fischer,** *who had been investigating the mutilation-rape-murder of* **Jasmine Willison** *in Greenacres, a suburb where many of the houses were based on gengineered plants, and* **Connie Skoglund,** *Bernie's occasional lover.*

The next day, the Chickadee was still at the Gilman's and still devouring lesser birds. Andy and Emily both wanted it gone, and Nick promised to call the small local airport and ask them to retrieve it. Emily left for work at Neoform Laboratories, where her assistant, **Alan Bryant,** *told her that another Neoform gengineer,* **Ralph Chowdhury,** *had a prototype for the wheeled armadillo vehicle he had been working on; she revealed that though they had no patent yet on the Bioblimp, Mayflower Van Lines was interested, and she set Alan to work putting kangaroo pouches on the sides of the Bioblimp.*

At a meeting, **Sean Gelarean,** *the swarthy research director, a gengineer of Palestinian extraction and with mob connections, revealed that he was aware of the Sparrow attack. Emily told what had happened in Washington: The patent decision had been postponed, in part because of an attempted preemption by the military, but there was strong interest from Mayflower. Chowdhury revealed himself to be a cantankerous, self-centered child of South African refugees who hated blacks and believed that his "Armadons" would drive all other bioform vehicles off the road. Emily and Alan Bryant antagonized him by pointing out that an armadillo's reflexes meant that if an Armadon was startled, it would kick its wheels off.*

Meanwhile, Bernie was being told by **Police Lieutenant Napoleon Alexander (the Count),** *chief of detectives and martinet, that there was no sign of terrorists in or around the Sparrow. It had attacked the highway by itself. Later, he learned from federal investigators that a strange PROM (Programmable Read-Only Memory) computer chip had been found in the Sparrow's control computer. The in-*

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vestigators were guessing that the chip contained a virus-like program designed to preempt the Sparrow's controls under specific conditions and cause it to misbehave. Bernie, eager to track down the terrorist who put the chip in the Sparrow, visited Neoform to talk with Emily. Unfortunately, Connie Skoglund was there before him, interviewing witnesses to the Sparrow attack, and he had to make an appointment for the next day. That evening found him in bed with Connie, while Connie insisted that Emily had a yen for him.

*Returning from the meeting at which Emily and Alan had criticized his Armadons, Chowdhury revealed that he hated not only blacks but whites as well and could countenance only browns as assistants. Even those assistants—***Adam Chand, Micaela Potonegra,** *and* **Zhang (Sam) Dong**—*he routinely chased out of the main lab to do their work in the stock barn. Chowdhury was strange in other ways as well, for his lab's high stools and worktables were reminiscent of an antique Calcutta bookkeeper's shop. But most ominous of all was his secret life—gambling had put him in debt, and the local casino boss had persuaded him to breathe new life into the illicit drug trade with such engineered items as a nettle whose hypodermic-like leaf hairs were loaded with cocaine. Going further, he had also developed "hedonic" jellyfish and snakes.*

At the Gilman home next morning, there appeared a strange bird resembling a bittern. The Chickadee, returning, chased it off before Emily could see it, and she was annoyed. When Nick promised to call the airport again, Emily went to the lab. She met Bernie Fischer there and explained how bioform vehicles were controlled by computers that plugged into their brains and activated neural circuits that controlled specific, naturally wired-in behaviors, and therefore how a sabotage chip must work. In the process, they caught Chowdhury trying to see whether a startled Armadon could indeed kick its wheels off. Bernie "helped" and thereby demonstrated a mean streak.

The Chickadee was gone by the time Emily got home, when Nick told her the "bittern" was still around and she would be able to see it. Unfortunately, by morning, the Chickadee was back. Nick called the airport immediately, but when Emily left the house, the Chickadee was still on the roof. Fortunately, so was the "bittern," and it swooped out of its tree to circle Emily's head. Unfortunately, it then attacked in an apparent attempt to impale Emily on its beak. Fortunately, she dodged, and when the "bittern" positioned itself for a repeat attack, the Chickadee seized and killed it. Unfortunately, the "bittern" wounded the Chickadee, which flew off. Emily examined the "bittern" and finally recognized it as an Assassin bird, a covert military weapon designed to be targeted on a specific person. Its beak was dipped in poison.

Why was it after Emily? No one knew, and when Bernie arrived, as part of the police contingent, he could not help. In fact, things turned worse when Nick jealously objected to the familiarity Bernie and Emily had developed.

Once Bernie and Emily had left, Nick answered the phone. It was the airport, telling him the Chickadee had returned just as the retrieval crew was about to

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leave. Unfortunately, before they could get it back into its hangar, it dropped dead. What *had Nick done to it?* Who *was going to pay? And did he know,* he *could be arrested for destroying other people's expensive property?*

Chapter Nine

"Jealous," he muttered to himself as the landscape pivoted about his vantage point. So her husband was jealous. "Hah!"

He had never thought of himself as a ladies' man, but Connie *had* said Emily had a yen for him, and maybe she did. Maybe her husband was right to worry.

Mentally, he slapped his wrist. Bernie, he thought, your mama raised you better than to think like that. Like a typical, male, fatheaded skirt-flipper.

But . . . was he handsome? He supposed so, or close enough. Sexy? Ask Connie, or Emily.

The radio's buzzer sounded. He picked up the phonelike handset and spoke: "Fischer here."

"You still anywhere near the Gilman place?"

He peered through the pod's transparent wall. He could already make out the roof of the Aerie. "Almost home, now."

"Litter! We have a complaint from the county airport. They have a dead Chickadee."

He had said he would check out the hangar, hadn't he? "Get a gofer up to platform three, then. I have an Assassin bird for the freezer. Evidence. Then I'll go see." Maybe it was the same Chickadee. If so . . .

"Thanks." The dispatcher's voice sounded relieved. "Everybody else is busy."

"Ten-four." Two-way radios might now be more like phones, but some things never changed.

The airport that had housed the Chickadee was an antique. Grass struggled to reclaim its cracked and rutted pavements. The arch-roofed metal hangars were streaked with rust. A few small private planes, lifeless and mechanical, gathered rust on the parking apron near a dilapidated terminal building. Even fewer modern bird-planes were visible, though their lost feathers and other litter testified that more must wait in the sun-baked hangars or be off on flights.

The airport manager was short, round, and bald, except for a thin fringe just above his ears. The hair that tufted above his eyes and in his ears and nose seemed much more plentiful. His name was Frederick Conal and, in between wide-eyed glances at Bernie's Hawk, he was complaining: "Yah, sure, it kept getting away from here, and he kept calling, telling me to come get it. And we did. Twice. But now—Look! Look at it, officer! He says an Assassin bird did it, but I think—"

"He's right," said Bernie. His Hawk stood next to a snow-white Dove. A twisted-wire cable bound the Dove's neck to a ring set in the concrete of the apron. Its interior—white leather and velvet, with black accents—looked very comfortable, but that was not what appealed to the Hawk. Bernie wondered if his predatory vehicle would try to take a bite. So did the Dove, apparently, for it sidled a few steps to one side, getting

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as far as its tether would allow from the Hawk's hooked beak.

Bernie did not choose to put the Hawk into dormancy. Conal was anxious for some reason, far more anxious than a dead Chickadee would seem to warrant. The detective wondered whether he might not play upon that anxiety. Scare him, he thought, and he might reveal something useful. And he wouldn't even have to try hard. Conal was a rabbit. He, Bernie, was an official predator. He was, he thought, a Hawk himself. He liked the image.

"A beak this long," he added deliberately, using both hands to show how long he meant. "It was trying to kill a woman, but the Chickadee grabbed it."

"That's what he said." Conal shook his head as if amazed at the heroism of a mere Chickadee, or at the fact that someone could tell the truth.

Bernie pretended to ignore the man as Conal gave the Hawk one more terrified glance. The Chickadee's carcass, one wing splayed, eyes already glazed, lay on the pavement not far from where they stood. No one had bothered to rig a tarp to shade it from the sun, and already the flies were gathering. Happily, so far there was no stink. He squatted beside the dead bird's neck and used a ballpoint pen to probe the wound. It was not the full depth of the Assassin bird's beak, he found. Nor did it seem to sever any major blood vessels. He looked closely. The edges of the wound were discolored in a way that did not seem due to mere drying. He sniffed. The odor was off as well.

He stood again, dusting his palms over his uniform knees. "Where's its hangar?"

Conal's eyes flicked left while his right hand flapped at the air. "What do you want . . . ? What's that got to do with . . . ?" His voice squeaked. "Do you have a warrant?"

Bernie stared at the man. Conal's eyes had gone to the nearest hangar, so close that the Chickadee must have been trying to reach it when it died. Why had his panic suddenly increased? "I don't need one," he said. "You called me in, remember? And I want to know how this Chickadee could keep getting loose."

"But . . . !" The day was hot, but the humidity was mercifully low. Bernie had not noticed any great accumulation of moisture on his own body. Now, he noted with interest, Conal's bald head bore noticeable beads of sweat.

"You have the right. . . ." Conal shut up as Bernie read him his rights. Then the detective turned toward the hangar. The door was held by a simple padlock-and-chain arrangement. He shook it. The door was solidly fastened.

"Unlock it."

When Conal refused, he drew his .357 magnum, held the muzzle close to the padlock, and pulled the trigger. The padlock shattered, and the Dove and other small planes parked nearby, startled by the report, spread their wings reflexively. Only his Hawk failed to respond. He pulled the door open.

"Lights?" Bernie kept the gun in his hand as Conal pushed past him, one arm extended to the right. There was a click, and a bank of overhead fluorescents came on.

The hangar was not much larger than the Chickadee itself. The floor was dirt, though a drain received the overflow from a metal sink whose single tap ran

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constantly, if slowly. Bernie supposed any bird confined to such a sweatbox would need plenty of water.

There was room in the hangar for the plane, a wheelbarrow, a food trough crusted with the remains of the Chickadee's recent meals, and a table. The jet's engine and pod hung from the ceiling. Maintenance tools decorated the walls. A few chairs were scattered around the periphery. A dungheap marked the Chickadee's customary parking position, and Bernie wondered why. At the Aerie, the city's main airport, litter was never allowed to accumulate. Then he recalled the mess outside, and its revelation that what picking up was done here—which clearly wasn't much—had to be done by human hands.

"Don't you have litterbugs?"

Conal twitched, satisfyingly rabbitlike. "They cost too much. We're just a small operation."

The hangar's corrugated metal walls concentrated the Sun's heat pitilessly. Bernie thought that that alone, even with the water, might be enough to drive a plane to run away during the day. So might the stink the heat cooked out of the dungheap. He scowled at signs of spilled jet fuel, and Conal said, "We do put 'em outside during the day, you know. On the line, out there. The hangars are for foul weather, and night, and winter."

With an abrupt wave of one hand, Bernie cut him off. Sweating now, and still scowling, he stalked through the hangar. He didn't know what he was looking for, but there was a faint touch of something strange to the stink in the hangar's air.

In the back, under the small wooden table and close by the dungheap, the dirt floor looked disturbed, as if someone had been digging. He scanned the hangar's walls. There was a shovel, its blade marked by ordinary soil, not the litter one might expect, or wish.

When he moved the table and reached for the shovel, Conal began to back toward the door. "Uh-uh," said Bernie. He raised the gun in his other hand as a reminder of the strength of his position. "Stay here." He whistled, and the Hawk's shadow moved to block the hangar's doorway.

He put the gun away and began to dig. Moments later, he had the answer spread out on the tabletop: two wooden boxes, each one twice the size of a shoebox. Each one was full of small vials. Each vial contained a gelatin capsule that might once have held vitamins. There were no labels, though the capsules were of various colors that might encode some meaning.

Bernie's voice was disgusted. "Hedonic parasites," he said aloud. He bent over the table to sniff the vials. He sensed nothing but the odor of freshly turned earth, and then he realized what the strange scent had been. It was not the smell of contraband, but—in a hangar that normally reeked of litter, jet fuel, and old birdfood—that very scent of dirt.

Smugglers, he thought. Coming in at night to bury the goods, or dig them up while money changed hands. Though the quantities of money could not be great. It was too easy to get the parasite eggs from another addict. Or might this be something new? He held a vial to the light. Through the translucent wall of

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the gelatin capsule he could see a small round dot that looked more like a seed. He knew about the nettles that had come on the market in just the last few months. Was that what these were? Whatever, the smugglers had been here, and they presumably had let the Chickadee out to give themselves more room in which to work.

The airport manager was huddled against one wall of the hangar, his body folded in upon itself as if he were cold. Bernie ignored him as he threw the shovel down and went to the Hawk. There he used the radio to call the dispatcher and request a warrant and a crew. They would search the terminal and the other hangars, collect the evidence, arrest Conal, and stake out the cache.

The necessary reports had taken time, but it was still morning when Bernie set his Hawk down in the Neoform parking lot and toggled it to sleep. He grinned when he noticed the Gilman family Tortoise not far from the slot he had chosen. He had some information for her, perhaps he could learn something more about gengineering, and maybe . . .

The Grey Lady at the reception desk kept him waiting just long enough to let him know that everyone called her Miss Carol, that it was an awful shame what happened on the expressway just the other day and she hoped he, as a policeman, would see to it that it never happened again, and that Dr. Gilman was such a nice woman, didn't he think? When Emily showed up on the other side of the turnstile, he could just barely restrain an effusive "Thank you!" until they were out of sight.

"She has that effect on everyone," said Emily. "I've heard security took a year to find her."

He stopped dead in the hallway and swung to face her. "You mean it's an act?"

"Oh, no!" Her wide mouth parted in a laugh, and he noticed the way the floral print of her dress swayed as if in a breeze and her pens bounced in the pocket on her bosom. She touched his arm to push him into motion again. "Oh, no! They wanted a genuine yenta. I'm told the idea is that she can keep any intruder talking—or listening—until the guards arrive."

"As long as she's on duty."

"Oh, well. There's someone else on the desk, but we lock the doors at night." He supposed the company's armed guards were on more visible patrol then, as well. "There's the lab." She pointed. As they began to slow down for the turn into her lab, a man emerged from a door on the other side of the hall, and a little further from them. He was slight, short, and brown-skinned, and when he saw them, he scowled viciously. Bernie thought he recognized the man, but had to grope for the name.

Only when they were in the lab could he say, "What's Chowdhury mad about today?"

"Probably the same thing as yesterday. He holds grudges." She gestured toward a young black man seated before a complicated array of control pads, glass tubing, and test tubes. "You met Alan. He's putting together an artificial virus for a gene transplant."

"How does that work?" he asked.

"Wild viruses can plug genes into

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DNA, but they put them anyplace. The ones we use can be designed to insert a 'cargo' gene wherever we wish in a genome. They can also be targeted to any type of cell in an animal's body. We have viruses for plants, too."

When he said nothing, she added, "The key is simple. DNA is built as a sequence of simpler chemicals, or nucleotides. And it can bind to matching sequences. Since the virus is also DNA, all we have to do is tailor the appropriate piece of it to match the target area we want, and the virus will do the rest."

Now Bernie looked confused. Alan grinned up at them. "We use them the way mechanics use pliers," he said, ignoring her little lecture. "You shouldn't have scared Chowdhury's Armadon for him."

"You heard, huh?"

"We all did, though it didn't help that you were with her at the time."

When Bernie looked puzzled, Emily explained, "There's a certain amount of rivalry between us. He wants those Armadons of his to be the next big product for the company. I want . . ." She told him about the Bioblimp.

"And the chowderhead hates everyone anyway," said Alan. "His parents were South African."

"Alan!"

He grinned sheepishly. "You know I can't resist."

Bernie admitted to himself that the epithet seemed inevitable. He knew just enough history to feel that Alan's description made sense, though he could not, at the moment, spell it out. He shrugged, smiled, waved a hand, and followed Emily to her office corner. "What's that gadget?" he asked, glancing over his shoulder.

"A DNA splicer," she said. "Have you found out something about that bird already?"

He shook his head, let his gaze drop to her ankles, and scratched one temple. "Not really. Though we know it's a government genima!, and the beak was poisoned."

"That stain!"

He nodded, watching her face, the wide eyes, the parted lips that let the words escape so quietly, almost in a whisper. "It stabbed the Chickadee." She nodded. "This deep." He showed her with his fingers. "And that was enough to kill it. I had the call even before I made it back to the office." He told her what else he had found in the hangar.

"Then Nick was right. It must have been in the way, and—"

"They were letting it out."

She stood up and said, "Coffee?" The coffee maker was on the windowsill. She had to step behind him to reach it, and as she did so, her belly brushed the back of his head. Was it deliberate? He let his head lean into her, and she said nothing. But when she had poured the two cups and handed him his, she retraced her path without touching him.

Shrugging mentally, he began to explain how an Assassin worked: Its handler showed it two photos, one of the intended victim, one of some landmark near which that person could be found, and released it not too far from the landmark. The bird would then locate the landmark and lie in wait until the target appeared. Often, as in this case, the beak would be poisoned, although the

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beak alone was quite sufficient if the bird hit a vital spot.

She let him get about halfway into his explanation before she stopped him with a chopping gesture of one hand. "I know," she said. "I looked them up this morning, when I got here. Neoform designed them for some government agency—I don't know which—years ago, when I was still in school. We still breed them, though that's a different operation from this." She pointed her chin toward the rest of her lab. Her expression said that she didn't like the idea of clandestine assassinations, whether directed at her or not.

He hadn't known, he told himself, that Neoform was responsible for the Assassins. But all he said was: "I'm getting hungry. Lunch?"

When lunchtime came to the police department, its clerks, administrators, and officers streamed steadily from the building's main entrance, slowing only when too many people tried to get through the door at once. At Neoform, Bernie therefore thought the rush of employees through the halls toward the main entrance entirely normal, at least until the traffic flow slowed and halted not far from the turnstile.

Emily had just introduced him to one of her coworkers, Frank Janifer. When everyone stopped, he asked the man what was going on.

"Miss Carol," he said. "The dragon at the gate making sure that everyone signs out properly."

"Security," said Emily. "They tried electronic cards once, until the day a summer intern showed up with six of them. She said she was supposed to put them all through the scanner. Their owners were in a rush."

Yet the technology of signing out was not obsolete. Electronic cards may not have worked, but no one had felt that a return to pen and paper was necessary. As each person came to the turnstile, they bent and worked an electronic wand over a plastic-coated surface connected by a cable to the company's main computer. Their signature was instantly compared with a template in memory, and the machine kept the essential records of who came in and went out, and when. The process did not take long. Soon Bernie and Emily were outside and walking toward a nearby restaurant. "I don't know much about gengineering," he said.

Emily sidestepped as a girl, perhaps ten years old, sped past them on a bicycle. "It began almost a century ago," she said. "Biologists first learned how to snip genes apart in the 1970s. The key was chemicals—protein enzymes — that cut DNA only at certain points. Very quickly, then, they learned how to add genes taken from one organism to the genome of another. They used everything from microscopic shotgun pellets coated with DNA copies of genes to viruses, which would carry a gene into a cell and plug it into the cell's DNA."

The restaurant featured a broad flagstoned patio overshadowed by a trellis supporting a heavy growth of vines. Most of the patio's tables were occupied, but they found a small one for themselves. Menus were already on it. When it was obvious that the waiter would be awhile in getting to them,

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Bernie said, "And now you use those artificial viruses."

She took a moment to scan the menu before she nodded. "Like the one you saw Alan assembling." She paused while she raised a hand to attract the waiter's attention. He nodded distractedly, as if to say, "Soon! Soon!"

"But they're a convenience, really," she went on. "We could do without them, if we had to, though it would make the gengineering go much more slowly. By the late 1980s, the early gengineers had already made bacteria that would produce human hormones and other drugs. They had even transplanted growth genes from trout to carp to get larger, faster-growing fish."

"Is that all?" said Bernie. It was hard to believe the technology had ever been so primitive.

"They were timid," she said. "Scared. There were groups that sued every time someone proposed doing anything more challenging."

The waiter finally reached their table. "Like making potsters?" asked Bernie. They were a hybrid of lobster and potato, with all the flavor of the former and the convenience of the latter. Emily nodded and ordered a glass of white wine and a potster salad. He asked for a beer and a hamburger and fries, made the old way, with potatoes.

When the waiter had left, Emily said, "Potsters were a very early development. I was thinking more of this." As she reached overhead to finger a dangling vine leaf, she stretched the bodice of her dress across her chest. Bernie felt his attention focus, but so did she, and the arm drew back. "I've been here at night," she said. "The leaves glow brightly enough to provide all the light this place needs. But things like this were only for the tabloids then."

"I'll bet they loved them."

"They would have loved the Sparrow, too."

"That reminds me . . ." That morning, after he had finished at the airport, when he had gone to the office to write up his reports, he had found on his desk a note from the Air Board's Alan Praeger, saying that they had finished their analysis of the chip found in the Sparrow's controller. And yes, it was indeed responsible for the liner's behavior. A timer had activated it on the Sparrow's approach to the airport, and then a simple program had directed it to the expressway and stimulated its hunger center. "You were," he said, "quite right."

Their drinks came, they sipped, and she twisted the stem of her wineglass in her fingers as if uneasy with his compliment. "It was simple," she said. "It couldn't have worked in any very different way."

He laughed and touched her hand. "Enjoy your strokes, Dr. Gilman. We never get enough of them. And then tell me what it took to get gengineering from bigger carp to Tortoises, Sparrows, and Armadons."

As she then explained it, while they ate and while they walked back to her Neoform laboratory, the simplest part of gengineering was finding and transplanting the genes that gave an organism the ability to make a new substance such as a drug. But that ability was useless for designing new creatures such as Armadons. Patterns of growth, of size and shape, depended much less on in-

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dividual genes than on large complexes of genes, including genes that controlled just when, in the course of development, various other genes became active. And synergy was crucial. Much of natural evolution, she told him, seemed to be due to changes in these controllers, which then changed the way all the other genes knitted together into a functional whole.

"We try," she said, "to mimic this natural process. We don't just transplant single genes. We change the way they are controlled, their timing, their interactions. And it's difficult work. It takes time to build, or rebuild, a genome that really works. And there are always bugs, just as in a computer program."

"Those wheels," said Bernie. "On the Armadon."

They were in the Neoform parking lot now, standing beside his dormant Hawk. "But don't underestimate Chowdhury. He's a better gengineer than I am." She shook her head. "I wouldn't dare to tackle making those Armadons. But he can do it. He's good."

Bernie looked perplexed. "What's so tricky about a giant armadillo?"

She pointed at the Hawk. "Big is easy, and that's mostly all we do to make many of our genimals. But he's also reshaped it to get those wheels, and the internal passenger compartment."

He shook his head. "It sounds like a Roachster."

"He likes to remind us that General Bodies had it easy, and he's right. They had a shell to work with, while an armadillo's armor is bone buried in its skin."

He opened the hatch in the Hawk's pod, stepped up and into his seat, and toggled the creature awake. It stretched, gaping its beak and extending its wings. "Gotta go," he said.

"Me, too."

He kept an eye on her, appreciating the lines of her body, as she began walking toward the building entrance. He watched her stop and turn when the Hawk's hatch slammed shut. But then he had to look away, to pay attention to his controls. He snatched only a glimpse as the Hawk set its wings, fired its engines, and leaped into the air, and he was delighted to see that she was still there, one hand shading her eyes, the other holding her fluttering skirt against her thigh. He wished he could remember what ancient movie had first shown him that sight.

Chapter Ten

On Saturday, Bernie Fischer and Connie Skoglund went to the Roachster races.

For Bernie, it began when Connie stopped him in the hall on Friday afternoon to say, "You look depressed. What happened?"

He told her about finding the boxes of capsules, which had indeed turned out to contain nettle seeds. "We set up a stakeout at the airport, but it was a bust. Someone passed the word."

She made a sympathetic face. "Sounds like you need a break. I won big last weekend. C'mon and share the luck."

"I don't bet," he said. He really didn't bet, and she knew it, for always before he had refused her invitations to the track.

"So come anyway. You'll have fun. And you need it."

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The Roachster races were not just for Roachsters. There were events for Buggies of all kinds, including Hoppers, Beetles, and even Tortoises. The paved, oval track had been built nearly a century before for the gasoline-burning stock cars and dragsters that now made the stands tremble with their bellowing roars only on nostalgic special occasions. Most weekends were now much quieter affairs, though the crowds made as much noise as ever. Some things never changed.

Bernie thought that racing Tortoises looked just plain silly, as did the Hoppers and Beetles. He favored the Roachsters, though he had never been able to decide which version he preferred. The wheeled Roachsters, with their stubby legs pushing on the wheeltops, made him think of wheel-chairs built for paraplegic galley-slaves. Legged Roachsters were derived from the spiny lobster of the Caribbean instead of the North Atlantic table lobster. They were so long-limbed that Bernie wondered how they could possibly run. In repose, their limbs jutted like the masts and yards of some prickly sailing ship. In action, they flailed the ground to every side like a berserk bundle of knitting needles. They well deserved such names as "Tatter's Hope" and "Orkney Nightmare."

Connie disappeared to place her bets. "Waste of money," he said and stayed to hold their seats. When the vendor passed nearby, he bought beer for both of them. He handed her hers when she returned and said, "It's a hot day. They should do well." The gengineers had made their arthropod-based designs more or less warm-blooded, with metabolisms that would function even in a temperate winter, but they remained true enough to their ancestors to work best in hot weather.

She glanced sidelong at him, most of her attention on the track, where the first race's stilters were taking their positions. She leaned closer; he bent to put his ear near her mouth. "How about you? Made a move on that Emily yet?"

The starter's gun banged in the distance as he shook his head. She squeezed his knee with her free hand and leaned forward to watch the race.

The crowd roared as the stilters began to move. The start was slow, much slower than for wheelers or other Buggies, for the track was so narrow that the stilters had to set their flailing legs among their neighbors' limbs to move at all. They managed it, however, and somehow without tangling, and as first one and then another broke from the pack's leading edge, the pace picked up.

He was left to wonder whether he had imagined a sense of satisfaction, even of possessiveness, in that squeeze. Connie had egged him on with Emily, but she had also invited him into her own bed. And this trip to the races *had* been her idea.

Later events only kept him wondering. For dinner, they bought take-out ribs near one of the city's parks and found a grassy niche beside a pond. There, Connie kicked off her shoes, stuck the toes of one foot up his pants leg, and said, "Go ahead, Bernie. Make a pass. I'll bet you score."

He had called himself a predator, but not of that kind. He was not a skirt-flipper. But why not go along with Con-

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nie, just to see what happened? "Maybe I will," he said. He pointed at her with a rib-bone, a scrap of meat dangling from one end. Connie had very little surplus flesh, and he didn't dare to touch her with his sauce-coated fingers. "She's bigger there."

The toes withdrew. Connie stuck out her tongue and turned her back on him. She was much leaner than Emily; Bernie could count the knobs of her vertebrae, though now he pointed somewhat lower.

"And there."

She turned back. "I'll bet it's all flesh. She doesn't work out."

"She's got a sit-down job. What do you expect?"

"She'd be a marshmallow in bed. All soft and . . ."

He grinned deliberately.

"And weak!"

His grin grew broader, but only for a moment. He stopped teasing her when she began to turn red. She was proud of her strength. He knew it, he enjoyed it, and she knew he enjoyed it. But there was an insecurity to her pride that left her vulnerable. He was beginning to doubt that she really meant it when she urged him to pursue Emily Gilman. He was beginning, in fact, to sense a cattiness, a jealousy of whatever time he spent with the attractive gengineer, even of what might in the future come of all her urging him in that direction.

He watched her flush fade away, watched her turn to face him once more, watched the toes creep back up his leg. How jealous was she? he wondered. How jealous could she get? Might she be the one who had sicced the Assassin bird on Emily? But where would she have gotten it?

He dismissed his suspicion. If she were ever to get nasty in any competition over a man, she might get very nasty indeed. But he thought that she would be more direct, more explicitly confrontational. She was a traditionalist. She would look for a woman-to-woman, hair-pulling, knock-down screamfest.

Suppressing his sudden urge either to laugh aloud or to speak, he took her hand and carefully, thoroughly licked every trace of the rib-sauce from her fingers. She did the same for him, her eyes sparkling at him above her busy lips. When they were done, they walked the city's streets hand in hand, window-shopping, debating the attractions of bars and movies while knowing that only one end to the day would suit them equally.

He liked her. He did. He even told himself that if he ever chose to marry another cop, Connie herself would be ideal, for she would understand the life, and the risks. She might, unlike his mother, even be able to survive his loss. He winced within as he realized that he had not considered the possibility that the loss might go the other way, especially if he married another cop. Could *he* survive such a loss? He did not know.

He said nothing. He told himself that he had long since sworn himself to a single life, one without hostages, and besides, there *was* Emily. She had more status in his mind than Connie; she was a gengineer, a shaper, not a mere guardian, of society. She also probably had more money than either of them. Maybe he *would* make that pass Connie kept urging on him.

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* * *

Bernie had flown over the suburb of Greenacres before. Now he was on foot, circling the neighborhood where that girl, Jasmine, had been so brutally murdered. Lieutenant Alexander had braced him that morning, saying, "You've been spending too much time on the Sparrow case. Let the feds have it. I want you to go over the ground again on that rape. Search the neighborhood. Look for witnesses. Look for *anything* unusual! Check the garbage!"

Garbage searches had been routine for decades, ever since the Supreme Court decided they were not an invasion of privacy. But the criminal they wanted had been smart, or lucky: there had been a pickup in this neighborhood even before the body had been found. There would be another early tomorrow morning, Tuesday. There would be nothing now. Nor would he find witnesses this way, unless he was very lucky.

He had perched his Hawk on the lawn of the house where the crime had happened. Now his path brought him around the block to see it before him, the Hawk stropping its beak on the tree trunk to which he had tethered it. The house was a small, six-room pumpkin that had been grown on the lot that spring. Once it had reached the proper size, it had been cut from its stem, levered onto a concrete foundation, and allowed to dry. Then workers had cut holes, sprayed the shell with sealants and preservatives, and installed doors, windows, insulation, interior walls, plumbing, and appliances. It had been empty when the rapist had broken in with his victim. The owners had planned to move in later in the month. Now there was a "For Sale" sign on the lawn. Bernie was not surprised.

There were three other pumpkin houses on the block, with curtains in the windows and children's toys in the yard. Across the street, a beanstalk twined around a concrete pillar that supported a Swiss chalet. A gengineered baobab tree swelled grotesquely to contain a two-story duplex. A flowering vine dangled giant seed cases equipped as apartments above a shallow pool in which flickered Japanese koi, colorful carp.

Greenacres held more conventional structures as well, but the "genurb" was a very good example of the new architecture. It was also not a cheap neighborhood. From the air, most of the dwellings vanished in the greenery of ample lawns and plantings, providing a landscape in which only the scattered orange dots of pumpkin houses and a few ordinary roofs stood out. The overall impression was of a carefully tended garden. Bernie thought that impression quite suitable for a place where so many of the houses were gengineered garden plants, though he supposed it wouldn't last. Future developments would be more crowded.

As the detective in charge of the case, he had a key to the house. He used it, and once inside the door, he sniffed. The slaughterhouse odor of blood, feces, and urine was now almost undetectable, canceled by vigorous applications of soap and bleach, its remnants covered by perfumed sprays. He stepped into the living room and stood with the broad bay window at his back, letting the morning sunlight illuminate the scene. There were still traces of bloodstains on the hardwood floor and plaster walls.

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There were even a few spatters on the dome-curved ceiling. He could also make out remnants of the chalk lines that had marked out the body and its parts. He shook his head sadly. The "For Sale" sign would, he was sure, be fruitless until the owners applied new paint and installed a carpet. The new house's brief but unfortunate history was far too visible.

He settled against the windowsill and withdrew a packet of photos from a pocket of his uniform shirt. The Scene of the Crime—he could not help but add the capitals—as it had first been seen. Close-ups of the dismembered body, forlorn, pathetic. A single footprint on the floor, stamped in blood. It was small, as if made by a woman, but still too large for the victim, as if she could have walked. Or as if the killer had played with her severed leg. It had worn a man's shoe, though, and it was clearly his. But definitely small. Was he a boy, not a man? Or . . . ?

He tapped the photos against the palm of one hand to align their edges. Man enough, he thought. He guessed. It must have been a man. He wished there had been some semen, even on the floor. If they ever found a suspect, DNA analysis would then quickly prove whether the semen was his.

The photos went back into his pocket. He explored the house, seeking any clues that might have been overlooked before. But the place had obviously been cleaned thoroughly, if not quite thoroughly enough to remove all the bloodstains. There had been a few neglected scraps of lumber and wallpaper, sawdust, bent nails, and the like in the corners of the rooms. Now they were gone.

There was a wastebasket in the kitchen. Remembering the Count's instructions, he checked and found it half full of the missing rubbish. On top of the basket's contents, he saw a withered leaf. He picked it up, felt it, sniffed it, and identified it as a nettle leaf. When he realized that it had done nothing to him, he peered at it closely. The myriad fine hairs that covered nettle leaves were all mashed flat, drained of whatever they had once contained.

So there had been a junkie on the premises. Maybe even the murderer. He tucked the scrap of evidence in a plastic bag and stored it in a pocket.

Then he looked into the basket again. He thought he had seen . . . Yes, there they were. Two of the plastic wrappings from instant film packs, and though the police had taken many photos on these premises, they had used electronic cameras. Not the sort of thing most citizens would have.

He put the scraps of paper in another bag.

Over the next three weeks, nothing happened. The Air Board made no progress on finding whoever had put the override chip in the Sparrow's control computer. Bernie found no more clues that might lead to whoever had treated Jasmine Willison so cruelly. And neither criminal made any mistakes that might have swung their fates against them. Life was, reflected Bernie, not a novel, in which one could count on some coincidence that would precipitate the mystery and lead directly to a satisfying resolution.

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Later, he repeated that thought to Emily. They had lunch from time to time, whenever she was not in Washington, sculling her patent application slowly through the bureaucratic shoals, and their schedules meshed. Sometimes she went to lunch with her coworkers, or with representatives of van lines and other shipping concerns. Sometimes he was busy himself. But often enough he was able to find an excuse—some question about controllers, chips, neural overrides, reflexes, even how the firm for which she labored worked—to enjoy her company.

"Tee gee aye eff," said Emily. "Thank God, it's Friday!"

They were coming back from lunch, navigating Neoform's hallways on the way to Emily's lab. Ralph Chowdhury turned a corner ahead of them, approached, and passed. His slight, oriental frame was leaning forward, fists clenched, mouth twisting around a glowering scowl. "Is he still worked up about the armadillo?" asked Bernie.

Emily shook her head. "Uh-uh. I think he got that licked."

"So?"

"He hasn't been saying much." She turned to look down the hall after the other man's departing form. "I suppose something hasn't been going right for him, but what it is . . ."

She was reaching for the door to her lab when it opened. An older man, greyhaired, his round cheeks just beginning to sag, reached for her hand. "Emily," he cried. "My dear! You'll never guess!" Bernie smiled to himself at the sound of the other's British accent. It seemed so pure, so ancient of nobility, while the permanently tanned skin and the prominent blade of the nose bespoke a recent immigration. He guessed that the man's parents or grandparents had come from the eastern Mediterranean, or perhaps from somewhat further into Asia. Certainly the last century had seen enough people departing the lands of Palestine, Lebanon, Syria, Iran, Iraq, Afghanistan, Pakistan, and the like.

"Sean. What's happened? Oh . . ." She introduced Bernie as the detective investigating the Sparrow incident.

"Oh? Still?"

"This is my boss, Bernie. Sean Gelarean." She stepped forward, forcing Sean to give way until all three were in the lab. Alan Bryant stood near the room's window, grinning broadly.

"Word from Washington," said Sean. "We'll have to celebrate."

"You mean . . . ?" Her voice rose in a breathless note of excitement. Alan grinned even more broadly and nodded furiously.

"The Bioblimp patent, yes!" Sean Gelarean showed a mouth as full of teeth as any horse's. "Sunday, at my place. We'll have everyone!" He seized her hand again, pumped it, said, "Everyone!" once more, even including Bernie in his inclusive glance around the room, and left.

"Where does he live?" asked Bernie. As he spoke, he wrinkled his nose. He did not much care for hearty Englishmen. No matter how pure or impure their Saxon blood, they always struck him as having some shameful secret to conceal. He supposed many of them really did—didn't everyone?—but why did they have to be so obvious about it?

"You've already had a call from

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Mayflower," said Alan. "They want to know how long."

"Greenacres," said Emily. "I'll get you the address." She turned to Alan. "I hope you told them it would take a few months to grow and equip the things."

"The eggs are in the tank already."

"Have you ordered the control boards? The crew cabins? The engines? The . . . ?"

At each item Alan bobbed his head, his smile as wide as ever, until he struck Bernie as nodding like some small dark bird gobbling seeds from a feeder. Yet there was nothing of subservience in his manner. He was Emily's technician and assistant, but he was more than an underling.

When Bernie looked at Emily, her mouth was splitting her face with as broad a band of white as Alan could possibly have shown. The way the two were sharing their relief and pride and joy was palpable.

He must have looked as puzzled as he felt, for when the excitement had calmed a little, they led him to a computer workstation, called up the necessary diagrams, and explained just what a Bioblimp was.

He shook his head in wonder. "It seems," he said, "as difficult as Chowdhury's Armadons."

"Oh, no!" said Emily. "This is just a scale-up, like I was telling you. Except for the pouches. And they weren't that difficult. Were they, Alan?"

"Fussy, maybe. But not hard."

"Ralph is definitely the best of us."

Bernie had talked to professionals before and found that they often felt they did not deserve their status or pay. What they did was easy, for them. What someone else did always seemed harder and more worthy. He wondered if Emily Gilman was deceiving herself in the same way.

Chapter Eleven

"Daddy!"

There he was, kneeling on the chair by the window, nose against the glass, staring toward the bird feeder. A coloring book and box of crayons sat neglected on the kitchen table. Nick grunted to signal his presence.

Andy turned his head enough to confirm that he was indeed there and paying attention. "Where's the Chickadee, Daddy?"

The boy must have asked the same question three times each week ever since the Chickadee had flown off. It, and Nick's patient, loving, sympathetic answer, had become a ritual that required periodic repetition. Was the boy, Nick wondered, rejecting, repressing, any hint that his mother's life could have been in danger? Or did he simply have to hear again and again the news that his mother was indeed safe? And that therefore *he* was safe?

Cautiously, watching for signs of upset, wondering whether—when?—they might have to take their son to a psychologist, Nick explained once more that the Chickadee was dead. The bird that had flown at Mommy, the one with the orange stripes, had stabbed it with its beak, and the beak had been poisoned. The Chickadee had flown back to its home, at the airport, and died there. It had been a hero, for it had saved Mommy, and she would be home soon from work.

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The boy turned his back on the window. "When I grow up, you know what, Daddy?"

"What?"

"When I grow up, I'm gonna have a Chickadee. Just like that one. All my own. I'll keep it in my yard."

This, too, was part of the ritual, as was the silent sequel, when Nick wondered anew each time at the workings of the unconscious mind. He guessed that Andy's final resolution must reflect some conclusion that a Chickadee in the yard might preserve him, too, from harm. It would be a talisman, a luck-piece, a charm against disaster.

The slap of Tortoise feet on the surface of the driveway announced Emily's return home. As Nick stepped outside to meet her, he thought he could still detect the faint odor of the cleaning solution he had had to use to get the stain of the Chickadee's litter off the brickwork of their house. He was glad the genimal would not be returning, for that, and repairing and washing the roof, had been work for which he had no enthusiasm.

The door to the Tortoise's quarters slid down with a screech that announced a need for oil. He sighed at the thought of more work, even though the task was not a large one. Then he grinned at the sight of his wife running toward him.

"The patent! We got the patent!" Her voice was joyfully excited, and her impact against his chest almost knocked him over.

"Mommy!" The door banged behind Nick, and Andy pushed between them, holding up his arms. Emily scooched to hug their child. In a moment she looked up at Nick and told him the rest of the story: They already had orders for the Bioblimp, and there would be a celebration at the Gelarean house, in the Greenacres genurb.

"It'll be interesting to see that place," said Nick.

"Can I go too?" Andy's voice was plaintive.

"It's a work thing," said his mother.

Sean Gelarean's place proved to be carefully landscaped. A Victorian gazebo overlooked a small fish pond not far from the road. The house itself was a crook-necked squash which, once it had been grown to size, hollowed out, and dried, had been hoisted onto a stand that let its neck jut high into the air, above the surrounding trees. Later, that neck had been fitted with narrow windows and a spiral staircase. It had become a tower, and the chamber at its apex had become Sean's den. Broad windows were visible in its rounded roof, and lush greenery that suggested a love for houseplants.

The rest of the squash, painted white with dark brown criss-crossing lines, bulged like some Tudor tumor beside the parking apron at the head of the driveway. In it were the living and dining rooms, the kitchen, three bedrooms, and more. A porch, its construction echoing the lattices of the gazebo, framed the main entrance. Roses bordered the porch and spread their fragrance like a fog over the nearby lawn. A caterer's van had rutted the turf near a side entrance.

The driveway and the small parking area were filling rapidly with cars. Gelarean's guests, most of them Neoform

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employees, and in pairs with friends or spouses, were wandering the nearby fringes of the yard, eyeing the plantings, the house, and the gazebo before trickling toward the porch, where their host and his wife awaited them. From what Nick could see of facial expressions and overhear of conversations, the consensus was that the Gelarean manor was a remarkable monstrosity.

When Nick and Emily finally reached the porch, Sean was wearing a rueful expression on his face. Grasping their hands, he introduced them to his wife, Victoria. She was a short, round woman, dressed in a red silk monk's robe, its hood raised, whose mouth jerked into a smile nearly every time he spoke. Then Sean said, "It *is* a horror, isn't it? But we couldn't resist it when we saw it."

Cool air flowed from the open door of the house behind them and made the fabric of Victoria's robe sway. Nick welcomed the promise of relief from the heat of the outdoors, but he stayed on the porch long enough to laugh at his host's pleasantry and say, "You must have been homesick."

The other nodded, his cheeks shook, and his accent thickened briefly. "That I was, wasn't I, Vicky? But it's comfortable." He leaned over the porch railing to pluck a newly opened rose, pinched off the thorns, and held it out. "Emily, my dear, Put it in your hair." As she obeyed, he gestured toward the interior of the house. "Drinks on the left."

In an alcove off the entranceway, one of Wilma Atkinson's genetic sculptures moaned and writhed as people passed it by. The bar was dominated by an octopoid genimal whose arms were pigmented with green and white stripes, like sinuous barber poles. It was taking verbal orders, and the arms worked in pairs, serving four customers at a time, pouring, mixing, shaking, wiping up occasional spills.

"I've never seen one of those before," said Nick.

"I saw a description in *Genginews*." That was the industry's trade paper. "But I didn't know they were on the market yet."

"They aren't."

Emily turned toward the speaker and cried "Frank! What do you know about it?"

Frank Janifer lifted his glass to them with a grin. "I hear our host let a friend do him a favor."

They laughed, and then they turned to note the vast seas of food the caterers were assembling and survey the rooms within their view. Polished tables, antique chairs, flower-filled vases, deeply cushioned sofas, thick carpets as soft as moss beneath their feet, all impressed Nick, and he murmured accordingly to his wife. They accepted small bits of meat wrapped in pastry crusts from a tray proffered by a perambulating waiter. And then people were leaving the circulating flow of guests to congratulate Emily on the patent, to speculate among the clinks of glasses on the applications of her Bioblimps, to wonder how they would contribute to the company's fortunes.

"I hear the stock went up a bit already."

"Have you thought of designing a walking suitcase?"

"Or an incubator for preemies."

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"Wait till the word about the Mayflower order gets out!"

"You could start with an ordinary kangaroo. . . ."

"Should be something four-legged."

"Use your options now!"

"Like a wallaby."

"Delicious appetizers! You should try . . ."

"Whatever. Leave it just enough brains to follow you on a leash. And a couple of big pockets on its sides."

"Make a great baby carriage!"

"Make it an imprinter, so if anyone else tries to open the pockets . . ."

"Chomp!"

Laughter. A small bell invited everyone to the buffet, where Nick found the centerpiece to be a whole roast litterbug, easily identifiable by its distinctive jaw. The roast, steam rising from its crusted back, was presided over by a Japanese chef wielding a carving knife the size of a samurai's short sword saying, over and over again, "Don't worry. Grain-fed, perfectly healthy, very tasty!"

No one seemed to have trouble believing him, for the carcass was rapidly diminishing beneath the strokes of the carver's blade. Nick obtained portions for himself and Emily, passed her a plate, and then, realizing that she was quite absorbed in her conversation, found a quiet corner beside a bookshelf on which he could rest his plate. Not far away, he recognized Bernie Fischer, the cop, likewise by himself, a plate in his hand, surveying the crowd.

He wondered how the detective had managed to be invited, but then he forgot the matter. A small man, grey-suited, his skin a shade darker than any tan could reasonably achieve, flat, reflecting panes of glass revealing only intermittently his dark brown eyes, was approaching. He was apparently looking for a niche like Nick's own in which to eat his meal.

"You're . . ." He groped for the name. "Ralph Ch—"

"Chowdhury. Ralph Chowdhury. I have a lab just down the hall from your dear wife's." He pushed a polished crystal knick-knack aside and set his plate on the shelf below the one Nick was using.

Nick blinked in surprise before he realized that, of course, the man was shorter than he. "The armadillo man," he said.

Chowdhury beamed as if delighted to be so known. "Your wife has told you of my poor efforts! I hope she hasn't made too much of our silly rivalry. I am delighted that she has her patent!" He raised his glass in a gestured toast. Then he tasted his roast litterbug. "Delicious!"

"I didn't see one outside," said Nick.

Chowdhury's laugh seemed strained, as if he were trying hard to be congenial. "I walked! I live not far away, right in the neighborhood. Besides, my Armadons are not yet ready for the road. Nor are they quite ready to take to Washington. But they will be. Soon! And then Neoform will dominate the transportation market in the sky and on the ground. Both!"

"It surely won't be long before Sean is throwing a party like this for you."

Chowdhury shrugged as if it didn't matter, or as if . . . "Not for me. He likes your Emily much better." A grin. "She's prettier."

Nick grinned back. "She is, but . . ."

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What could he say? He brought the subject back to the Armadons, and then, while Chowdhury described his genimal, concentrated on his food. The roast was indeed delicious, and he finished his serving quickly, but when he looked toward the buffet table, wondering whether there might not be a little more, he saw nothing but an empty space. The remnants had already been removed.

Chowdhury followed his gaze. "We had our share," he said. "Though I, too, would like some more."

A thought occurred to Nick as he nodded: "Neoform doesn't make the litterbugs, does it?" When the other indicated that he was right, he added, "Then serving one is quite symbolic, isn't it?"

"Devouring the competition, you mean?" Chowdhury stared at him for a moment. Then his gaze flicked to the nearby policeman. "You have a poetic mind."

Nick shrugged. "Perhaps I give Sean too much credit."

"Or perhaps not." Chowdhury's tone became quieter, almost musing. "And you make me wonder. Are the police making any progress?"

"On . . . ?"

"On those attempts on your Emily's life."

Bernie Fischer suddenly assumed a more erect posture, as if something had just made him more alert. The movement drew Nick's eye, and he wondered what the reason might have been. But he did not pursue the question. Chowdhury's query still awaited an answer.

As far as Nick knew, the police had made no discernible progress at all. At least, no one had told him that they had any clues as to who had programmed the Assassin bird to attack Emily. Yet, for some reason he did not himself understand, he said, "I'm not in their confidence." He gestured toward Bernie Fischer. "There's the one in charge, and he does his talking to my wife. But from what she tells me, they're getting very close."

"How nice!" Chowdhury showed his teeth in a broad, beaming grin, but Nick could see the corded lines in his neck that said his jaw muscles were tense. His body odor seemed to carry a touch of spice that Nick thought seemed to fit the other man. The spice was . . . what? Then he had it. Curry.

"I expect they'll have him very soon."

The other drained his glass abruptly. "It would be a shame if anything happened to Emily. You have a child . . . ?"

They chatted for a few moments more while they emptied their plates. Then Chowdhury left, saying he wanted to find a sweet. Nick remained by the wall, watching the crowd, glancing from time to time toward Bernie Fischer, who in turn seemed to be following Chowdhury with his own gaze.

According to Emily, Chowdhury was abrupt, abrasive, abusive, temperamental, secretive, impatient, and intolerant. But he had been quite cordial just now. He had been willing to speak at least a little about his Armadons. He seemed interested in the search for whoever had programmed the Assassin bird to attack Emily. He seemed sympathetic and concerned.

Nick preferred to believe his wife. She was not the sort of person who could convince herself that a thoroughly nice

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person was so awful, and then describe that person so to others.

Chowdhury therefore had to be dissembling. But why? Was he hoping to get on the good side of Neoform's current fair-haired girl? Did he wish that some of her good fortune would rub off on him and make his Armadons as great an initial success as her Bioblimp? Or . . . ?

Nick left his plate on the shelf and wandered through the house. Where was Emily? There, talking animatedly to her technician, Alan. She saw him and waved her glass. Beside her was another Atkinson sculpture. Elsewhere he found more conventional artworks, each displayed to good advantage but safely set behind glass barriers, all originals, all expensive. Either Neoform was very successful or, as he had heard from Emily, Victoria Gelarean had indeed brought money to the marriage.

Nick would have liked to climb the tower both for its view and for the sense of power, of overlordship, that he thought might accompany having such an extension of one's house. He would also have liked a look at the greenery there, and thus some sense of what Sean Gelarean might really be like behind the bluff exterior he showed the world. But locked doors barred all exits from the party's assigned rooms, except to the outdoors.

One of those locked doors turned a narrow hall into a cul-de-sac. He was testing the knob, thinking the door might open to the tower, when he felt a hand on his arm. He let go of the doorknob abruptly, embarrassed even before he realized that the hand belonged to Victoria Gelarean. The hood of her red monk's robe was back, revealing wrinkled skin, a vividly birthmarked cheek, and twinkling eyes. Her lips were pursed as if she were recalling something for which she did not care. She shook her head gently and said, "He doesn't let me go up there. Not even me."

Her hand exerted gentle pressure, steering him back toward the living room, where the bulk of the party was still concentrated. As they turned, he saw that Bernie Fischer was watching them. He had a drink in his hand, but he looked as if he too had been wandering curiously, trying doors much as Nick had been doing. Was Sean Gelarean then a suspect in some heinous crime? Or were police detectives simply just as nosy as he himself?

Victoria released him when they came to the bar, saying, "Why don't you have a little wine, dear?" Nodding, Nick filled a glass before turning toward the room to find her already gone from his side, circulating among the other guests. Gelarean was nowhere in sight, but there was Chowdhury, in a corner near a bathroom, so close against a stranger that their bellies were almost touching. Nick smiled at the sight. The stranger's pink tuxedo covered a mass of solid flesh that matched the slight gengineer three times over. He listened impassively, and when he spoke, when he reached out to pat Chowdhury's shoulder, his smile seemed a decal pasted into place to simulate approval. When the two men turned away from each other, that smile disappeared as if it had never been, and Nick glimpsed a coldness of soul that would have been out of place in an insect.

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Nick had been to other Neoform parties, but he had never seen the man before. Was he a neighbor? If so, Nick thought, then Greenacres was a much less congenial place to live than its obvious wealth and stylishness might suggest. If he was a business contact—Nick hardly dared to wonder what sort of business, or how he must treat his employees. If he was a friend, then what sort of person could Sean Gelarean really be?

A hand clasped his arm from behind. He jumped.

"Did I startle you?"

It was Emily. "I was spooked. By a real creep. Over there, in the pink tux." He pointed, but the stranger was gone. He had to settle for describing the man. He said nothing about his attempt to open locked doors, or the way Gelarean's wife had stopped him.

Emily shuddered. "There's no one like that around the company, I know. You ready to go home?"

He was.

Chapter Twelve

What a weak-spined, pussy-whipped excuse for a man that Nick Gilman was! A jobless househusband! A pussycat, neutered and turned into a hearth rug for his wife to walk upon! Chowdhury pitied their son. A boy should grow up with proper role models: women who stayed home, content with children, kitchen, church; men who showed their strength, who dominated their women and the land as one.

Chowdhury could not help but think so. His parents had set the model for him, even though they had also violated it. Neither of them had been in any position to dominate anyone's land. And his Papa had worked in the kitchen as often as his Mama, for she had often been off with their fellow exiles, listening to their dreams of return and treating their illnesses, even confined as she was to a wheelchair. But he had been a man who knew how to use his belt and his fist. He had also told the boy stories of the homeland, where men were men and women knew their place, and he clearly wished that things had never fallen apart. He wished, indeed, for only such change as would let him join the dominant whites on equal terms. His Mama clearly wished the same, though she could also say, with full and laughing awareness of her irony, that a proper man was a Boer, boar, boor, and his slogan a borborygmic grunt.

Chowdhury had had his reasons to make so nice to Nick Gilman. But it had been an effort, a severe effort. He was, he knew, a snarler, a croc, as his Mama might have put it, in the river of life. His temper was worse because he had finished his latest illicit creations and turned them over to his masters. Now he was waiting for their reactions, and patience was not among the few virtues he claimed.

Chowdhury shivered at the thought of what he had learned by making so nice for so long to such an abysmal hearth rug of a man. His master, the one who gave him most of his orders now, was not far away. He could tell him things, frightening things, things that would demand action, or flight. But not here, not now. Later, later, the time would come. And then, perhaps . . .

Chowdhury obtained a cup of coffee, fortified with a dollop of Irish Cream,

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and a small square of cheesecake. He ate and drank, wishing that his Indian half were less strong, or that his inner mind could accept the fact of his professional position and attendant prosperity. In India, in the old, pre-Black South Africa, for all he knew in the modern post-Boer South Africa, men displayed their wealth in their bellies, in the fat that announced to all the world that *they* had enough, and more than enough, to eat. But somehow, he could never bring himself to eat enough to swell out with that commanding presence of the real man, Boer-boar-boor or not.

He watched the crowd around him. *There* was that cop, always around, poking, prying, destroying. *There* was Victoria Gelarean, a woman unfortunate of face and figure but a woman for all that, serving her husband's needs as a woman should, quiet and self-effacing. She had one hand on the small of the hearth rug's back, and she was pushing him gently toward the bar. They had come from another room, and Chowdhury wondered if Nick Gilman had been exploring where he shouldn't. If so, perhaps he was less anemic than he seemed. He had wanted to see the tower room himself when he had first visited this house. Eventually, he had, but he knew that it was normally kept behind locked doors.

A mass of pink gestured Chowdhury imperiously to join it in the corner by the bathroom door. He obeyed, and as he drew close enough to see the doughy face atop the pink, he recognized the gesturer as that man who had first set him the task of making the cocaine nettle. The pink was his tux. The mass was his torso, so enviably well fed. The smooth, round face was smiling thinly, coldly, though that did not disturb Chowdhury. He did not know the man's name—the thugs and dealers and waitresses at the casino had just called him "The Boss"—but his rank was clear. Chowdhury knew that he, like his predecessors in the Family, the Mafia, the Cosa Nostra, whatever the papers called it at any one time, was a manipulator of games, dollars, drugs, and lives. He was also, as Chowdhury's Papa—and Mama—would have recognized immediately, a real man.

When Chowdhury was within reach, a pink-wrapped arm extended like the proboscis of some parasitic beast. A heavy hand clasped his shoulder and drew him in to face, too close, the other's diamond tie tack. The fingers kneaded Chowdhury's flesh painfully. The voice, all threat softened by careful layers of oil, murmured, "You've done a good job, Ralph. Good work." The thin smile broadened. "Fetch me a drink? I don't want to be obvious out there." He glanced toward the cop, Bernie Fischer, and his smile became more genuine. "I do believe he recognizes me."

"Of course." Chowdhury shrugged free of the hand, marveling that the casino owner could enjoy so obviously the stares of a policeman. Vanity! he thought, even as he felt the niggling truth that he might well react in the same way. If only he had the recognition he deserved.

"Just club soda."

As Chowdhury crossed the room to the bar, he noted the flushed faces and loud voices of the other people at this party. Many of them had been guests at the party thrown by that company

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lawyer. They were not avoiding alcohol or, perhaps, less licit substances, but he saw no sign of any nettles in their pots.

This man, his master, The Boss, the "baas," in the language of home, was carefully staying sober. He wondered how drunk he could get in private, or at his own parties. Or did he always keep his senses solidly about him, the better to control, to manipulate, his games and drugs and lives?

When he returned, the other accepted the glass of bubbly liquid, raised it to eye level, and repeated, "Yes, good work." He sipped, and the toast was done. "I came to tell you so myself, though ordinarily we let him—" a flick of the eyes "—handle you."

Then, Chowdhury thought, they must have found his creations interesting.

"The nettle was fine. though perhaps you could shorten its life?" The words came slowly, laboriously, as if, like Chowdhury, he too had to strain to speak soft words.

"But never mind. It's quite marketable as it is. A considerable success. But then . . ." He paused to sip once more from his glass. His dark eyes bored into Chowdhury's skin. "We weren't sure anything more was possible. You surprised us. Snakes and jellyfish!" Another pause. "We love them."

Chowdhury grinned nervously as someone passed behind them to get into the bathroom. He wondered if this love, proclaimed in such a coldly passionless voice, meant that he would be freed of his debts. He suspected not. He was more valuable than ever to these people. They would surely refuse to run any risk that he would escape. Freedom was not in the cards.

When the bathroom door closed, the other said, "We want two thousand of those jellyfish. Immediately. And two thousand of each of the snakes."

"I've already started the jellyfish." They had been easy to start. He had simply left the lights over their tanks on a little longer to convince them it was time to breed and then released a burst of pheromones into their water. He sighed at the thought that if they proved popular, there would have to be a factory of considerable size just for the necessary aquaria. Breeding nettles, jellyfish, and snakes would need another sort of factory, rather more like a farm. He hoped he would not wind up in charge of it.

Chowdhury recalled the scene when he had introduced his creations. His immediate master had come to his lab, demanding tangible progress. Reluctantly, he had described what he had done. He had pointed to the aquarium and its contents. Then he had brought out the snakes in their terraria, the asps, the coral snakes, the mambas. Tiny things, sleek and colorful, loaded with hedonic venoms.

Within himself, carefully hidden from this underworld lordling all in pink, he smiled at the memory of his master's initial revulsion, of how intrigue began to show, of how the man had wished to try the venoms out. He had had to caution him, saying, "Be careful. With the jellyfish, you just leave your hand in longer for a larger dose. With the snakes, I linked the drug and pigment genes in reciprocal tandem. The paler the color, the less pigment, the more

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drug there is in the venom. You can start the customers off easy, and then sell them stronger and stronger pets. Don't take a light one."

"I understand tolerance." His master had reached for one of the darker, more brilliant reptiles and let it bite his arm, nearly as dark-skinned as Chowdhury's own. His eyes had closed, his mouth half opened, his breath moaned outward in an ecstatic groan. "I like that," he had said at last. "And so will they. I'll pass them on."

And indeed they had. "The snakes," Chowdhury said, "will take a little longer."

"What a pity." The man in pink shook his head. "Those will be much more profitable." He sighed heavily. "In fact, one of our board members was saying he wished we could retail them through legitimate channels. He even suggested an advertising slogan: 'Make an asp of yourself!' "

Chowdhury chuckled dutifully at this display of the other's wit.

But the lighter tone did not last. The other stuck the fingers of his free hand into the top of a pants pocket. Then, abruptly, as if the pocket concealed some secret switch, he asked, "How long?"

Chowdhury shrugged. They would grow quickly, but . . . "I'll need a month or so to build up the breeding stock, even using hormones to speed their growth. Then, say, six months before you'll have many for the market."

The other shrugged as well, though he did not look surprised. Perhaps, Chowdhury thought, he had some small sense of biology. "*Qué será* . . ." He patted and squeezed Chowdhury's shoulder once more. He said, "Then you'll have plenty of time to come up with something else," and turned away. The interview was over.

Something else? No, they would not let him go. Never, or never until he lost his touch or the competition proved more imaginative or the police caught them all. He told himself not to worry about that last possibility. He could always claim that he had been forced to do his work, though he did find it satisfying, if not as satisfying as his Armadons. And besides, as the lordling in the pink tuxedo had begun to say, "*Que será, será.*" What will be, will be.

Behind the door he stood beside, the toilet flushed and a deep, gurgling voice, like that of a drowning troll, rumbled, "Don't forget to wash your hands!" A more normal voice swore, and there was a rush of water in the sink. Chowdhury chuckled and moved away.

But what else was there? Nettle, jellyfish, snakes. Bees, wasps, and spiders were also venom injectors and could be tailored to deliver drugs that were effective in small quantities, such as hallucinogens. Even mosquitoes and other biting insects might work, for they injected a droplet of saliva when they bit. In fact, a snake's venom was a modified saliva in the first place.

But they were bugs. Nonusers, ignorant of their value, would swat them, smearing all their value on walls and arms and rolled newspapers. And people who would use them would surely be too few; bugs were not popular. What was worse, it might be difficult to keep

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them from escaping and multiplying endlessly. Then the world would have a drug problem!

Lost in thought, Chowdhury made his way toward the Gelareans's door. As he neared it, a billow of red converged upon him. He reached for the doorknob anyway, but before he could touch it, a soft hand seized his wrist. "Ralphie! You can't leave yet!"

He raised his eyebrows. The woman's crimson hood was up, her birthmark a mere shadow on her cheek. "But I must, Victoria."

"I know he wants to talk to you, and—"

"We can see each other at the lab tomorrow."

Her voice added to its quiet insistence just a hint of desperate wail: "But he told me to be sure . . ."

He shook his head. "Lovely party, Vicky, but I've had enough for now. And I'm sure he would rather relax with you once everyone else goes home."

Her voice went quiet. "I wish you were . . ."

Was she about to say "right"? He did not want to hear of the Gelareans's marital difficulties. He pushed the door open and slipped outside before she could say any more.

Dusk had fallen, but the heat still struck him like a wall after the comfort of the house's air-conditioning. He had been in Maine once, at about this time of year, and he had been impressed by how livable a place could be if only the day's heat gave way to coolness. One could recover.

He had a small air conditioner in his small apartment. It was a necessity of life much further south than Maine. So was a wife, in Maine as everywhere else. Sean was fortunate. Hearth rug Nick Gilman was even luckier, for he also had a child.

It was too hot to rush. He walked slowly, ambling, looking at the bioform houses that he passed, studying the few other pedestrians on the walks. Not far away, he knew, there was an empty pumpkin house with a "For Sale" sign on its lawn. He had walked past it more than once in recent days, wishing that he could afford to buy it, or perhaps something more elegant, like the Gelarean place.

He had been married once. But she had left. She had called him cruel, abusive, mean-spirited, and worse. She had wanted him to see a therapist. They had drugs, she had told him. They can teach you not to hate.

He had refused. Of course. So had his Papa, when Mama had said the same thing, or close enough. So he, too, would sleep alone tonight. There would be no one to whom he might boast of his achievements.

Feet clicked on the walk behind him. He turned his head, and there, faltering as she noticed a stranger's perhaps hazardous attention, intention firming as she decided to take a chance, now again catching up so quickly, was a woman. Young, buxom, white teeth gleaming in her dark face as she smiled a greeting. The sheen of sweat. An aroma of musk. A schwartzer. What the Boers, and his Papa, called a Kaffir. An Arabic word for infidel, once used to refer to the most intelligent of the Bantu groups, the Boer equivalent of "nigger."

As she drew abreast of him, he increased his pace enough to stay with

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her. He hated blacks, yes, as he hated whites. He always had and he always would, after what they—both of them!—had done to his parents. But he was lonely tonight, and his masters had approved of his work. He was feeling almost friendly, and in an unfeigned way quite unlike the act he had deliberately performed for Nick Gilman.

He waved a hand at their surroundings to catch her eyes. "My apartment is lots cooler than this."

She looked at him. Their eyes met. She laughed. "So is mine. And it's not far away."

He felt something open up within him, brightening and relaxing. Was it possible? Could such a simple overture possibly have evoked any interest at all? A delicious thrill ran through the core of his being, and he told himself that she was not truly what he hated. Schwartzer, yes, but not Kaffir, not the savage blacks who had taken over virtually all the continent of Africa and slaughtered whites, yellows, other blacks, everyone who was not of their tribe. Her ancestors had surely never been within a thousand miles of South Africa. In fact, they had been among the persecuted, just as had his parents. He could see it in her eyes, dark pools stained by generations of slavery, oppression, and discrimination. And besides, she was surely not a black, not a true black, not in this country with its centuries of miscegenation, recognized and unrecognized. She was a colored, like him.

She touched his wrist as if by accident. He smiled. "I can hardly wait. A cold drink. A cold shower."

"Me, too," she said, and her touch repeated. It was not an accident.

"But it would be so much nicer with company."

She nodded, smiling broadly. "I can hardly wait." A pause, just long enough for his hopes to soar like a police department Hawk. And then she lengthened her stride, drew ahead, and looked back to say, "My boyfriend's there already."

His spirits fell once more. She had been toying with him, and he would find no more satisfaction, of any kind, tonight.

Chapter Thirteen

"Fischer!"

Lieutenant Napolean Alexander's office had one small window. On its sill was a dirty ashtray that dated from the days when the lieutenant had been a pipe smoker. On humid days, its carefully preserved encrustation of tar and ash added a strong note of stale tobacco to the office air. Until the year before, a rack of dusty pipes had held down papers atop the filing cabinet in the corner and made the stench even worse.

The rack of pipes had disappeared when the Count had decided they made it too hard to resist temptation. But the stacks of papers were still there, as clear a sign as Bernie's typewriter of underfunding. All the rest of the world was thoroughly computerized and had been for decades. The best the police could do was equip booking desks and evidence technicians with slow, cranky, limited-memory OS/2 machines from the last century. The officers had to write their reports on even older electronic typewriters, as their predecessors had once had to use manual typewriters. Obsolescence was a police tradition.

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"Fischer!" the Count repeated.

Bernie was staring through the window at the rain that drew a grey curtain across the front of the Aerie. The bicycle rack was invisible. "Yes, sir!" As usual, Bernie's salute was sloppy and his stance was a far, far cry from the rigidity of the "Attention!" his superior had all but shouted.

The Count licked his bright red lips and said, very softly, "I hear that you are spending too much time at the Neoform labs. Sniffing after Doctor Emily Gilman like a dog after a bitch in heat!" Spittle sprayed from his mouth to sprinkle the desktop. A few droplets landed on Bernie's shirtfront.

Bernie stepped backward at the force of his boss' explosion. First Connie, he thought. Now him. Emily was a sexy lady, yes, but why did everyone think he should be trying to get into her undies? "But—" He tried to speak, but he was given no opportunity.

The Count's next words were softer: "I've seen her picture. She's pretty. Good boobs. Nice ass. But you're supposed to chase that ass on your own time!"

Finally, he could say something. "It's work, sir, really. I'm—"

"Not any more, it isn't. The feds are handling the Sparrow case, and you don't need to do any more research on gengineering, do you?" He didn't give Bernie a chance to reply. "And I told you to concentrate on that mutilation-rape!"

'But they're linked!"

The Count, still leaning over his desk, blinked. For a moment, he looked almost owlish. "Explain that."

Bernie tried his best. "The rape was in Greenacres, right? And two of Neoform's major people live in that genurb." He sketched Ralph Chowdhury, his hatreds, and his rivalry with Emily Gilman over their creations. He told how he had happened to be invited to the party celebrating Emily's patent, and he described Sean Gelarean, company founder, and his richly furnished, limited-access house.

"Chowdhury," he said, "may think he has good reason to want Emily dead, and he would know how to fiddle with the Sparrow. And the Assassin bird, which is a Neoform product! She may be the next woman we find in pieces."

The Count settled back in his seat and shook his head wearily. "I doubt it."

"And Gelarean's house. I'm suspicious. I'd like a warrant."

Lieutenant Alexander shook his head again. "No grounds."

"Greg Florin was there. In a pink tux." Bernie had indeed recognized the casino owner. Because the state did not license gambling, Florin's operation was illegal. But the police ignored his transgression, tolerating him as long as he kept away from more socially disruptive activities. Because there were rumors that he was not in fact avoiding those activities, his presence at the party was ominous.

The Count sighed. Both men were aware that the drug business was reviving with the aid of the same gengineering technology that had almost destroyed it at first. They recognized the potential of a gengineering firm such as Neoform.

"I was checking out that house the other day," Bernie said. "As you suggested. And I found a nettle leaf."

The mood in the Count's small office

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had changed. Bernie was no longer on the carpet, no longer under suspicion of uncontrollable randiness. He was, instead, an official hound tracking prey through a maze of misdirection. He was a hawk indeed.

"Connections," said the Count. "You're right." He sighed heavily. "Stay with it, then. Carry on."

Before Bernie could close the door behind him, he added, "But no search warrants. Not yet."

The rain had ended by noon. the clouds had dissipated, and the city had steamed all afternoon in the summer Sun. Now, Connie Skoglund's air conditioner hummed in the background.

"I still think she wants you." Connie's motions as she sliced onions and green peppers with a long-bladed knife were fast and efficient. In a moment, she would add them to the pepperoni-and-cheese pizza Bernie was taking from her freezer. They already had glasses of a cheap red wine that could pass for Chianti.

"That's the last one," said the fridge. "Should I put more on the list?"

Connie pitched her voice an octave higher: "Check!"

"Bull." Bernie set the pizza down on the counter and sipped heartily from his glass. "It's a strictly work relationship, and you know it." He had barely had a chance all day to think about the Sparrow case or, for that matter, about finding whatever monster had murdered Jasmine Willison. Nor had he yet said a word to Connie about his confrontation that morning with the Count. She had brought up Emily's supposed infatuation with him entirely on her own.

She shook her head. Her brown hair, still glossy from a recent brushing, bounced. He smelled a flowery shampoo and wished he too had gotten away from work with time to shower and change. All he had been able to do was unfasten the harness that throughout the day had held his .357 magnum in its shoulder holster. His shirt was marked by still-drying sweat beneath the arms, the stain a simple, civilian moon under his right arm, but a moon extended by a shape that resembled the subcontinent of India beneath his left. He could smell himself. His scent was not much like flowers.

"Uh-uh," she said. "Bull, yourself. No way. You wouldn't be hanging around her so much if that was all it was. And she wouldn't be letting you."

"It's research!"

"You don't have to see her every day for research."

"I don't!"

"Near enough."

A thought suddenly struck him. He set his glass down. He laid one hand on her shoulder and turned her to face him. He told her what the Count had said he had heard.

When he was done, she raised a hand to brush his arm away and turned back to the pizza. "Jackass."

"What do you mean?"

This time she turned around on her own. She held her slicing knife up between their faces and shook it. "I said, you're a jackass. A fool. You don't get it, do you?"

He shook his head.

She sighed. "It doesn't matter whether you've got the hots for her or not. You're hanging around Neoform, too,

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when you hang around your Emily, and you're making someone over there nervous."

She made sense. Of course. Someone wanted him out of there and they must have called the department. He didn't think it could be Nick Gilman, for though he might be jealous, he was also scared for his wife's life. Chowdhury? Gelarean? Someone else? He could not say, though he could guess. He had no real evidence, but there was, as he had told the Count, a personality, a history, and a rivalry that could, together, lead to violence. Every cop had seen it happen more than once.

"Look," said Emily. "Alan finally got the bugs out of those pouch genes." Her fingers moved over the keyboard of her workstation. A Bioblimp appeared on the screen. Where the first Bioblimps had been roundly symmetrical, this one was slightly elongated. Ghostly fingers, barely visible on the screen, plucked at its flanks to open the folds in which it would tuck its cargo. There were only two, and their openings faced toward what, Bernie supposed, must be the front of the genimal. Ghost fingers poked into the pouches, their depth of penetration communicating internal size.

"I thought you already had the patent?"

Her dark hair jerked as she nodded. "Sure. But it describes the pouches in very general terms. This is design work, not invention. Details."

The next sequence showed the Bioblimp in action, hovering over a house, anchored to a tree with one tentacle, using others to lift the roof from the house and pluck furniture from the exposed rooms.

"It makes moving look easy," said Bernie appreciatively.

"Removable roofs are the simplest of the changes that will make sense once this thing is on the market. Look here . . ." She keyed another animated sequence, and a Bioblimp, this time with the Mayflower logo visible on the side of its gasbag, floated through the air toward a high-rise apartment building bedecked with balconies, each one painted with a number. She pointed. "Addresses."

One tentacle wrapped around a balcony railing to moor the van. A human figure stepped out of the apartment, opened a panel in the wall of the building, and pushed a switch. The entire apartment slid out of the building like a drawer from a bureau, and the moving van began to pull furniture from its cargo holds and place it on the apartment floor.

"Our patent lawyers are going nuts." She grinned at him. "We're remaking the world, aren't we?"

"As long as you don't redesign people so they don't need to eat. Lunch?"

"Where?"

"You choose."

"The Bed & Buggy Motel has a nice luncheon. It's just a couple of blocks away."

There was a moment's silence while they stared at each other, both of them fully aware that, whatever their purposes in going to a motel, most people went to such places for only one thing. Finally, he said simply, "Why not?"

To reach the motel, and its restaurant, they had to walk through a small neigh-

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borhood shopping center. There was a grocery, a hardware store, a liquor store, a cleaner, two small boutiques, a barber shop, a drugstore, and more. As Bernie and Emily approached the entrance to a shadowed bar, its door opened partway. A voice, warmly feminine despite its obviously synthesized nature, murmured, "It's awful warm out there. Why don't you come inside and be comfortable? The beer is cold." A free sample of the bar's conditioned air gushed refreshingly across their ankles.

They passed on, noticing that most of the stores were busy. The neighborhood was by no means crowded, but there were plenty of people on the sidewalks. A steady stream of Buggies passed down the street, wheels, legs, and occasional engines making their various distinctive noises, while litterbugs waited by the roadside, darting out to retrieve their prey as necessity demanded and opportunity offered. From time to time, the traffic slowed to eddy around a heavy-bodied, squash-nosed, bow-legged Mack truck that had stopped to load or unload cargo. Some, like airliners, wore both their driver's cab and a cargo pod strapped to their backs. Others wore just a cab, towing their cargo in long trailers.

As they walked, Bernie talked about his meeting with the Count, the phone call that had prompted it, and what it meant. Seeing a couple on the walk ahead, their hands entwined, he wished he dared to take Emily's hand or to put an arm around her. To keep himself from doing so automatically, thoughtlessly, he sawed the air with his hands as he talked.

She moved closer, and their thighs brushed. She said, "You hadn't told me about that rape."

He described it as briefly as he could. She made a face. "Do you really think someone at Neoform could have done such a thing?"

"You can never tell. Chowdhury—"

"Hates everyone, black or white, I know. But . . ."

He shrugged. The motel they wanted, with its restaurant, was in sight a hundred feet away. He pointed, and his stomach rumbled. Emily laughed and touched his arm.

A blare of horns broke out behind them. They heard crunching noises, and screams. Movement on the street and sidewalk abruptly froze. Those people who had been walking toward them stared, eyes wide, toward something behind. Those who had been going in their direction turned, and then they too stared. There were pointing hands, gaping mouths, more screams, and then, only seconds after the opening fanfare of vehicular brass, people and Buggies alike were fleeing in panic-stricken rout.

Unlike all the rest, Bernie and Emily did not flee as soon as they had turned to look. Half a block away, a mid-sized Mack, the equivalent of the previous century's ten-ton trucks, was accelerating down the street. Ignoring the Buggies already on the pavement, it brought its massive paws down wherever it wished, accounting for the crunching noises and a few, only a few, of the screams they heard. Blood and other fluids ran in the gutters of the street. A litterbug, its stomach burst, made a particularly messy smear on the pavement. The Mack's bulldog jowls shook and

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quivered, and great gobs of foamy spittle flew to strike the storefronts beside the road.

A brightly painted cargo pod was strapped to the Mack's broad back, its forward end a bubble of clear plastic behind which the genimal's driver, her face contorted, pounded on a control board. Clearly, the beast was not responding as it should. Emily gasped, "The Sparrow!"

Even as Bernie and Emily saw it, its broad jaws, full of teeth, gaped. It growled, and then it uttered a deep-throated, rumbling howl, as if a freight train were trying to bay. It changed direction, swerving toward them across the road, pausing only when the cargo pod caught on a lamppost.

Neither Bernie nor Emily could move, even though adrenaline was surging through their veins. The threat was too great, too immediate, and all their energies were focused on their senses as they sought some route for their escape. Small details loomed large. Bernie noticed the cracks in the yard-wide collar to which the forward edge of the pod was clipped, and then, beneath the monster's throat, a dangling ornament, a foot long, a box on wheels, and shiny with polished chrome. In a moment, he recognized it as a model of an old, engine-powered eighteen-wheeler.

The Mack braced its legs and tried its best to force its pod through the lamppost. It tried again, and it succeeded. But the necessary pause, while the driver's compartment collapsed and shards of plastic eviscerated her, gave Bernie the chance he needed to unfreeze, draw his magnum from beneath his jacket, and begin to fire.

The Mack struggled and tore the lamppost through the remainder of the cargo pod. More plastic flew. Cardboard boxes spilled into the roadway. The Mack's jaws gaped wide again, and Bernie fired between them, trying with all the nerve and skill he could muster to put his slugs through the roof of the monster's mouth and into his brain, or through the back of the throat and through, severing the spinal cord, whatever would end the onslaught of the berserk juggernaut this genimal had become.

With a final roar, it collapsed atop a Roachster whose driver had driven onto the sidewalk in his efforts to flee and now cowered in his seat. The pushed-in snout, each nostril larger than Bernie's head, the whole looming over him and Emily like a whiskery wave, was only a few feet away. A puddle of drool was already growing on the sidewalk. The smell was precisely what one would expect of something whose not-so-distant ancestors had been dogs.

The ululating screams of Hawks announced the arrival of Bernie's colleagues, almost in time. The first two landed on the Mack, their talons furrowing the genimal's fur, and promptly put their heads under their wings. The hatches of their bubbles popped open, and Connie and Larry Randecker emerged.

Connie scanned the now growing crowd, stopping with a look of surprise when she spotted Bernie and Emily. "Look at the Great White Hunter," she said.

"Ferchrissake!" said Larry, staring. "Will you put that iron away?"

Bernie obeyed, but not until he had

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replaced the gun's magazine. He was not at all sure he would not need the weapon again before the day was done. "What are you doing here?"

"Pure coincidence," said Connie. "We were there when the dispatcher pushed the scramble button."

"What happened?" Larry gestured impatiently, and he and Connie switched on their recorders simultaneously.

As Bernie explained, more Hawks swept out of the sky to land. The crowd gave way, and the new arrivals began to assemble crowd-control barriers, examine the Mack, photograph the scene, and look for the fragments of its control apparatus in the rubble that covered the street. As they found the pieces, they swept up the remaining debris.

"Where were you going?" asked Larry.

"Lunch."

"But where?"

When Emily pointed at the motel just ahead, Connie gave Bernie an appraising look and an exaggerated wink.

He sighed. "Just lunch."

However, when they finally got away from the scene of carnage, neither Bernie nor Emily had any appetite. They went into the motel's restaurant, and they ordered drinks, but then she said, "I'd rather just lie down."

Bernie looked at her. Her hair was disordered. Her blouse was sweat-stained. Her face was lined with recent stress, and her eyes showed far more white than usual. There was no trace of seductiveness about her.

He was not surprised. He felt none himself. "Sounds like a good idea," he said. He drained his scotch in a gulp. She did the same with her gibson. He dropped a twenty on the table to cover the drinks, and then he led her to the motel's front desk.

When they were in their room, Emily proved as good as her word. She kicked off her shoes, flopped on one of the room's two beds, and closed her eyes. Bernie went to the window, held back the drape, and found that it overlooked the street where they had stood not long before. The Hawks were still there, Connie, Larry, the other cops, and a tow-Mack pulling a wheeled flatbed trailer. He studied the scene, passing quickly over the pile of mangled Buggies, lingering when he noticed the row of body bags on the curb. He counted them. Seventeen.

Abruptly, he turned away, went into the bathroom, and knelt before the toilet. He vomited.

The cool hand that stroked his neck and shoulder was comforting. "It gets to you, doesn't it?" she murmured.

"I can stand it." He rose, unwrapped a motel glass, and rinsed his mouth.

"Your stomach can't." When he shrugged, she added, "Maybe you should lie down for awhile, too."

Later, she said, "I can't tell my husband."

Bernie held one breast in his hand and thumbed the nipple. It swelled in response, but not nearly to the extent that it had just a little while before. "Does he get violent?" Nick Gilman hadn't struck him as the type, but one could never know. That was a day-one lesson for every rookie, every police academy cadet. He had even recited it for her when she had asked if he really thought

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that someone at Neoform could have killed Jasmine Willison.

"No." She patted his belly, making his small roll of flab jiggle. "But he'd be hurt." She paused. "Or maybe not. He was telling me just a few weeks ago, when I thought I was in too much of a rush to look out the window and see that Chickadee, that I seemed to have forgotten how to stop and smell the flowers by the side of the path."

"Some flower." He kissed her temple gently.

She signed. "Maybe I'm remembering how, again? I used to be able to. Or maybe it's just shock."

"It could be both."

"I still won't tell him. And we shouldn't do this again."

Chapter Fourteen

The Count was waiting in the hallway when Bernie Fischer reached the station Tuesday morning. Beside him was a slender fellow whose grey mustache did not match his jet-black hair. He was wearing a white lab coat and carrying in one hand a small case covered in green-dyed leather. In the other hand, he held a cane.

Bernie had never had much to do with the man, but he recognized Daniel Addering, the vet who took care of the department's genimals. He needed the cane because a Hawk had once bitten his thigh; the leg had been weak ever since. "Hi, Dan," he said with a nod. He then looked at Lieutenant Alexander.

"I've asked Dan to look at that Mack truck that nearly got you yesterday," he said.

Bernie snorted. "You might as well call in the meat packers," he said.

"You don't think I'll find anything?" asked the vet. His voice was heavy with the practiced softness of one who was used to gentling animals in distress.

"Not in the carcass." Bernie paused while he stared the Count in the eye. Finally, he said, "I'll bet you my next raise the problem's in the thing's controls. And it's an extra chip, just like the one in that Sparrow."

"I heard about that," said Addering. "I'd like . . ."

The Count, ignoring the vet, stared back at Bernie. "It won't take long to see if you're right, will it? Though we'll need a computer jock to find it."

Bernie shook his head. "I know where to look. And I have a photo of the other chip."

"Then get it."

Bernie did, and the three men left the building and turned down the street. Addering's limp did not slow them enough to matter. A block away, they stopped before the loading dock of an old, brick-walled warehouse. A smear of something dark led under the dock's truck-sized main door. Set in that door, to one side, was a smaller personnel door, which Lieutenant Alexander opened with a key from his pocket.

A few small and filthy windows were set high in the warehouse's walls. Those that faced the Sun admitted narrow beams of dusty light. The room was still cool from the night, but the heat was already growing noticeably. The odor was of dust and mildew and dead meat.

Above were girders draped with wires and ancient spider webs. To one side stood three careless tiers of cardboard

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boxes, wooden crates, and plastic barrels. To the other slumped what had to be the Mack's carcass. Its back was toward them, one ear cocked absurdly ceilingward. They could not see its lifeless eyes.

The Count found the light switch, and banks of fluorescent lights slung beneath the distant roof came on. Half the fluorescent tubes were dead, and half the rest flickered dimly. The few remaining improved the cavern's lighting only enough to let them see that the smear by the door continued, ending in a pool of blood that had congealed around the Mack's head and neck, where Bernie's bullets had torn its vessels open.

Addering stepped closer to the beast. He stood near its shoulder, head bowed, one hand resting on the cold, stiff flesh. In a moment, he reached up with his cane and pushed at the base of the erect ear. It fell away from him, forward and over the genimal's face, into a more normal configuration. "It's hard to believe," he said at last, "that a handgun did this."

"I like one with plenty of punch," said Bernie. He leaned slightly forward as he spoke, belligerent. "And it had already killed enough bystanders." He was proud of what he had done, of saving Emily, himself, more bystanders. He did not think that any animal-lover, even the official police vet, had any right to criticize.

"A .357 magnum." His superior laid one hand on his shoulder. The fingers bit into the flesh, drawing him back to civility.

"Ah," said the vet. He still had not looked at Bernie, had not noticed the effect of his words, but the moment passed. He nodded sadly. "Poor thing."

Bernie turned away, toward a windrow of more mechanical debris along the wall. Had Addering really meant to criticize? He had certainly taken the man's first words that way, but perhaps the vet merely felt sympathetic toward the dead genimal. He shrugged mentally. Here were the remnants of the Mack's cargo compartment. Next to them was a stack of the boxes that had been its cargo. "Where's the dashboard stuff?"

"There?" The Count pointed toward the other end of the windrow. The Mack driver's blood-stained seat rose from the rubble, surrounded by the crumpled metal of the cabinets that had housed the Mack's control circuitry.

The cushions of the seat had been shredded by the same flying shards of plastic that had killed the driver. On them, Bernie found the bloody model truck that had hung from the Mack's collar. The blood was dry, so that when he picked it up, his hands remained clean.

"You should take it home," said Lieutenant Alexander. "Great souvenir."

"I think I will." He set the truck down again, turned his attention to the cabinets, and rummaged until he found what he thought might be the right one. He pried at what had been access ports with his hands, but he accomplished nothing but a creak or two of protest from the distorted metal.

"Help me." The other two loaned their strength to his, and the metal gave. He reached in, felt, and pulled out a

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circuit board. He examined it, set it aside, and drew out a second.

"There." His grunt of satisfaction told Lieutenant Alexander and Dr. Addering that he had found what he sought. He pulled the photo of the Sparrow's chip from his pocket and held it beside the chip he had found on the board. He held both to catch the best light he could, and then he grunted again. "Same part number," he said. "It's a PROM, all right. And the serial numbers are even sequential."

Later, Bernie held the chip in the palm of his hand and stared at it. There had been no fingerprints, of course, just as there had apparently been none in the Sparrow. He didn't need them to know, as surely as if he had been present at the scenes, watching the installation of the chips, that one person was responsible for them both. And if they had been installed by different hands, then certainly the same mind was behind them both.

The warehouse had become an oven in the time that Bernie had been in it. Sweat dripped from his hairline, and he breathed cautiously through his open mouth. The Mack lay in pieces now, its skin removed, the gases of heat-hastened putrescence escaping to the air.

One person, one man, behind both the Sparrow and the Mack. But he could see already that there were differences. The Sparrow had gone to a specific place at a specific time and there engaged in a specific behavior. And that behavior had been perfectly normal, peaceful feeding, at least from the Sparrow's point of view. If the person behind the Sparrow had had a particular target, the method had been haphazard. It could have worked only by luck.

The Mack, on the other hand, had seemed to have a specific target in its mind. He had been convinced at the time that it had been coming straight at him, or Emily, or both of them. It had, like an Assassin bird, been programmed to respond to a specific image with a direct, unhesitating, straight-line attack. If he had been unarmed, he and Emily would now both be dead.

The Count had left shortly after Bernie had found the chip, though not before telling him to find whoever was responsible. There was no hint that he should restrict his investigation in any way. Neoform would be fair game, and he could spend as much time with Emily as he wished. Not that the Count knew anything about the aftermath to the Mack's attack, but even if he did that might not matter. The Mack had attacked when Bernie had been with her, and that might well mean that Bernie was doing something very right in seeing her. He grinned at the thought that he might find his next clue in bed.

The vet had lingered to examine the Mack, patting its side as if it were not lying dead in a vast tomb, but merely ill and the warehouse a kennel of suitable size. He had left only when the meat cutters had come to dismember the Mack. He had vanished as soon as he saw the first of their blades and bonesaws. He had, thought Bernie, known what was coming.

In cooler weather, those workers would be wrapping the meat they removed from the enormous carcass, packaging it as future meals for the police department's Hawks and other gen-

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imals. They would do the same for a dead Sparrow, a Roachster, a Tortoise, whatever came their way. Few owners wanted the meat for themselves, and insurance companies were all too willing to write off the value. It saved the cost of towing and disposal. But part of the deal was that in hot weather, when the meat spoiled overnight, or when the carcass must be examined and delays allowed the meat to rot, the department would handle the disposal.

Bernie tossed the chip in his palm. There was no reason why he should stand the stench a moment longer. Besides, he needed a phone. He wanted to ask Alan Praeger how he had managed to read the Sparrow's chip.

Bernie Fischer parked the Roachster in a no-parking zone shaded by an American chestnut, a heritage of those early days when gengineers had defeated the blight that had nearly destroyed the species. There had been little money in the cure, he once had read, but students had needed a research project. Students had also been responsible for potsters and the first simple pumpkin houses.

He emerged from the Roachster and patted the vehicle's side. The chestnut tree seemed a slender sapling beside the ancient oaks that adorned the campus, but its shade was dense and cool and would protect his vehicle from the Sun while he was gone.

He walked around the beast, comparing it with the Hawks he vastly preferred. The genimal's thoracic shell, mottled brown and greenish-blue and orange-red, swelled to create a bubble equipped with seats, controls, windows, and doors. The doors were plastic blazoned with the Department's emblem. The Roachster's head and mouthparts were protected by a steel bumper bolted to the shell. The creature's legs ran backwards atop the wheels to propel them. Its antennae, at rest, curled back over the thorax. The massive claws, missing in the civilian models, projected forward, long arms of the law. They were the features that had first sold police departments on these genimals. General Bodies had given the first ones away, and as soon as a cop had used those claws to tear the wall out of an apartment building and seize a screaming, flailing kidnapper, the market had begun to boom.

In its way, Bernie thought, it was as marvelous a product of the gengineer's art as a Hawk. But he loved Hawks. Roachsters he could barely stand, though he could drive them when he had to, as he had today for the short trip to the city's south side and the university.

He entered the computer science building to find air-conditioned coolness and a wall-mounted, glassed-in board that listed names and office numbers. Minutes later, he was in the second-floor office of the man he had come to see, and Henry Narabekian had plugged the Mack's chip into a circuit board wired into his workstation.

Narabekian wore a thick mustache as if to compensate for the near hairlesness of his scalp, but every hair was black and glossy. He was one of those who became bald when young. He was also very obviously a busy man, for his desk, bookshelves, even the antique Apple computer that adorned the top of his filing cabinet, were smothered in piles

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of papers and disks that threatened constantly to tip and wash both Narabekian and his visitor out the door. But he was also willing to help.

"There," he said as lines of program code began to scroll up his screen. "It took me an hour to get into the other one. But this is just the same. Except in the program itself. There . . ." He froze the screen and pointed. "Activates the territoriality circuitry in the hypothalamus. It saw you as a severe threat."

Bernie grunted. "But why us?"

Narabekian scanned the program further. "There. That tight block of binary code is a stored image." He tapped commands into his keyboard, and an inset on the screen blossomed into a face, Emily's. "Pretty lady. Not both of you then. Just her. Introduce me? She doesn't *look* dangerous."

"She's married." He did not mention his own interest in her. Nor the fact that his heart sank at this confirmation of his fear. He had never really suspected that the Sparrow had been aimed at her. But there had been no question about the Assassin bird. And now this. The pattern was indisputable. Someone clearly wanted Emily Gilman dead.

But why?

Narabekian shrugged. "If it sees a match, bang. Push the turf button. And go for the throat."

"I thought it would be something like that."

"Have they caught whoever buggered the Sparrow?"

Bernie shook his head.

"Same guy then."

"But . . ." Bernie shrugged. "We have to find him."

* * *

Neither one of them was looking at the other. She was staring at the walls. He was scanning the restaurant's other patrons. Both were too aware of what they had done two days before. He at least—he couldn't speak for her—wondered if . . .

"Isn't that Chowdhury?"

Emily craned her neck to look where he was pointing, two tables to his right and a bit behind her. "It's lunchtime, Bernie. And our people eat all over this neighborhood." In other words, there was nothing alarming about seeing him here, in the dining room where they had been unable to eat after the Mack attack and before . . .

Then why was he watching them so intently from behind those flat, reflective panes?

Bernie looked away, returning his eyes to the menu in his hand. When Emily said, "We didn't pay much attention to the decor before," he looked up again. The decor lived up to the Bed & Buggy's name: The ceiling lights were mounted on imitations of old-fashioned, wooden wheels, too narrow-rimmed to be wagon wheels. From each wall projected a relief molding of a four-poster bed. On one wall, the bed contained a Roachster; on another, a Beetle; on the third, a small, rounded antique automobile. On the last wall, the bed's covers bulged, and a horse's head, eyes shut, lay upon the pillow; behind the bed was the shadowed outline of wooden wheels and a high, fringed buggy-top. The dessert cart, waiting near the kitchen's swinging door, was another four-poster, high-canopied and on wheels.

He grunted. Then, as they ordered,

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he resolved to ignore Chowdhury. Emily had tried to refuse his invitation to lunch, but he had told her he had some information about the Mack and its chip. Finally, he looked at her. Her pupils were wider than the restaurant's dimness could account for. Was she worried? She would be. Or was she simply nervous about their return to the scene of their own crime?

"Someone," he said. "Someone is out to get you."

"I know that," she said quietly. "The Assassin bird had to be aimed. But yesterday . . . That was just random, wasn't it? Like the Sparrow?"

He shook his head. "The Mack was aimed, too." He fished the Mack's chip from a shirt pocket and laid it on the table in front of her. She picked it up and studied it while he told her of the image Narabekian had found, and of what the Mack had been programmed to do if and when it found a match for the image. "The chip was identical to the one in the Sparrow," he added.

For her, he didn't need to spell it out any further. "Then they're trying harder," she said. She passed the chip back to him.

"I wish there were more clues."

Their food came, and they picked at it. "Are there any?" she asked.

"A few," he said. "Enough to let me suspect a particular person."

Her face brightened. "Who?"

He shook his head. "But not enough to let me say his name out loud. Or to arrest him. I need more evidence."

They finished their lunch in silence. Eventually, while they sipped at coffee, Bernie took a paper bag from the seat beside his own. Something in it clanked against a plate when he set it on the table.

"What's that?"

"The Mack had it around its neck." He pulled from the bag the model truck. He had washed away the blood to reveal the gleaming chrome. "I thought your boy might like it."

"Would he ever!" Her grin was as wide and enthusiastic as he might have wished. But at the same time she was staring blankly at the truck. Finally, she stroked it once with her fingertips, slid it back into the bag, and drew the bag to her side of the table.

Bernie stared at her until she finally met his eyes. Then he asked her, "Would you like to lie down for awhile?"

She looked away from him for a long minute before she finally let her head jerk in a single abrupt nod.

Chapter Fifteen

Andy was delighted.

His mother had come home from work, changed into her bathing suit, and climbed into the warm water of the backyard wading pool. She didn't leave much room for him, but he didn't seem to mind. He pushed a boat toward her. She pushed it back. He wound up a whale and let it loose to thrash its tail. He splashed her. She splashed him back.

They both hooted with laughter. And when she moved to a towel spread upon the lawn, to sun herself dry in the declining rays of the afternoon Sun, he sat beside her, blissfully ignoring the stickiness where skin met skin.

"What did that Mack truck look like, Mommy? When it was trying to get you?" She hadn't told him about the

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incident. When she had come home Monday, he had met her with the news that she had been on the veedo. She hadn't noticed the reporters and their cameras, although it did not surprise her to learn they had been there.

"All teeth, honey. All teeth." She made a face at him. He squealed. "It wore a collar," she added. "Just like a real dog. And on that collar . . ."

"What?" He bounced on the edge of the towel.

"It's on the front seat of the Tortoise. Go see."

He jumped up and ran. In a moment he was back, in his fist a brown paper bag that sagged under the weight of something heavy. "Is this it?"

She nodded. Slowly, as if he were trying to draw out the special occasion, he spread the top of the bag, peeked in, and exclaimed. "Wow!" he said. "The collar ornament!"

The door to the kitchen opened, and Nick stood there, staring toward them. She waved, and he said, "The wine's ready." He was not smiling.

"You play with that for a while, Andy," she said. Then, scooping up her towel and the empty bag, she went inside.

"What's wrong, Nick?" She was in tan slacks and plaid blouse now, her wineglass in her hand, watching her husband chop vegetables for a stir-fry. His motions were abrupt, reined-in, tense. His wine was untouched.

When he finally spoke, she could sense the effort it cost him to keep his voice calm and quiet. He lay down the knife, raised his glass, and took a hearty swig. "You don't give a damn, do you?"

She said nothing. Another swig. "You come home. You say hi. You go off with the kid. You don't even ask about my day, or say anything about your own. I'm just a fucking cook! And where the hell did you get that truck? It's off that Mack, right?"

She nodded. "Bernie got it for me. We had lunch. . . ." She felt herself beginning to turn pink as she thought of what she had done. She wished desperately that her blouse would camouflage her guilty blush and he would fail to notice.

"Bernie!" He exploded. "You're seeing too damned much of him!"

"The investigation—"

"I don't give a shit about the investigation!" He stopped, looked at his glass, and realized that it was empty. Shoulders slumped, he went to the fridge, stared at the wine carton, and reached instead for a handful of ice. He found the scotch in the cupboard under the sink and poured as if it were amber wine. She said nothing.

"Yes, I do," he said more quietly. "I don't want a Mack to get you." His control was back. "But this Bernie . . . He's drawing you away from me. Isn't he?"

She shook her head, but still she said nothing. What could she say? Nick was jealous, but not without reason. They had their problems in his joblessness, in the fear of losing his wife to a murderer. And he was right about Bernie. The detective had drawn her from the start, and the Mack had weakened her, allowed her to step over the line. And

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she had succumbed a second time as well.

She set down her glass and reached for her husband. She wanted to hug him. she wanted to say, in actions if not in words, that she was still his. But he shrugged her off.

Then Andy came inside, looking for his small share of their evening drink. In unspoken agreement, as they had done before, as nearly every couple through all of time had surely done, they suspended their discussion, pretending for the child's sake that all was well. They knew there were exceptions, people who paraded every shred of anger and dissension before their children, but they had no mind to be among them.

The tension was still there Thursday morning. Breakfast was a silent affair, not helped by Andy's frequent glances toward the bird feeder and his wish, voiced just once, that another Chickadee would show up.

When they were done, when Emily had put her dishes in the sink, when she had picked up her briefcase, Nick said, "Are you going to see Bernie today?"

She shrugged. "We don't have an appointment, if that's what you mean." Or a date, she thought.

"Well." A hand twitched. His stiffness mounted, as if whatever he was about to say was difficult. "If you do . . . if you do, tell him thanks for the truck."

"Yeah!" said Andy. The doorbell rang, and he left his cereal bowl on the run. "There's a Hawk on the lawn!" he yelled.

She looked down at her still-seated husband, feeling his pain as her own. He had tried, hadn't he, to apologize for his suspicions? And as soon as he had done so, a Hawk had arrived to slap him in the face. Perhaps worse was the lift she had felt in her breast at Andy's words.

But the Hawker at the door was not Bernie. The figure that followed Andy into the kitchen was female, and Emily recognized her. "Detective Skoglund. Connie."

"I wanted to catch you before you left," she said. "I need your account of the Mack attack."

"Of course," said Emily. She set her briefcase down again. "Coffee? I expected to see you Tuesday. At Neoform, like the last time."

Connie shrugged. "You know how it is. Busy." She studied first one of them carefully and then the other, and Emily wondered if she could sense the pain that had suffused the room such a short time before. The kettle whistled. Emily poured, and when both women had their coffee, she shooed Andy off to play and pointed at his chair. Connie sat down, turned on her recorder, and began to ask questions. Emily answered them all as best she could, until Connie asked, "And what did you do afterwards?"

"We went on to the restaurant."

"I'm surprised you had any appetite left."

Emily hesitated. "I didn't." She glanced sidelong at her husband. He was watching Connie intently. "We just had a drink."

"And then?"

"I went back to the lab. There was work to do." When Connie stared at her, she felt herself blush. How much

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did Connie know? How much had Bernie told her? Were they close? Had she interviewed him yet? *Did* detectives interview each other?

She looked again at Nick. He was watching her now, not Connie, and on his face she thought she saw just a hint of a forlorn puppy that knows it is about to be given to a new owner. He hadn't missed a thing.

Connie was looking at him, too. "I have some questions for you as well, Mr. Gilman."

"Why? I wasn't there." His tone was glum.

"But you're close to your wife, and . . ."

"You mean I'm a suspect?"

She nodded. "That's the other reason why I'm here. Now, is there any reason why you should wish your wife harm?"

He looked shocked. "Of course not!" He clearly meant what he said, and Emily's heart warmed.

There were more questions, probing for his knowledge of PROMs and genimal controls, for any history of emotional instability or violence, for possessiveness and jealousy. At the end, she grew explicit: "How would you feel if you learned your wife was sleeping with another man?"

As Nick's mouth fell open, Emily felt her face turn pale with shock. She watched as Nick stared at Connie, who in turn was watching Emily, a slight, knowing smile upon her lips. She waited for the explosion that had to come, now that someone had all but spilled the beans. But why? Why should she do that? Did she want Bernie for herself?

Finally, he said, "That is none of your business."

"He's right, you know," said Emily. "I think you'd better go."

Connie had the grace to look down as she said, "That *was* out of line. Sorry." She clicked off the recorder, said "Thanks for the coffee," and left.

Emily and Nick stared at each other across the table. They could hear Andy talking to himself in the other room, the thudding boom as the Hawk's wings grabbed air for its take-off, almost each other's thoughts.

As the Hawk-noise faded, Nick said, "You *are* spending too much time with that cop."

She shook her head. "Not as long as someone's out to kill me. He's protection."

"But what if they're trying to get *him!*"

"They're not." She felt awful about deceiving him, but she did not dare to tell him the truth. She could not face the possibility that he would leave her.

She reached across the table to cover his hand with her own. "I'm the target." She told him of the image Bernie had found in the Mack's chip.

He sighed. "I still get jealous," he said. "So does that other cop."

"You saw it, too?" She smiled at him. "Yes, I like Bernie. But I'm not about to walk."

The Tortoise accelerated smoothly down the entrance ramp, its legs pumping vigorously in the periphery of Emily's vision, and merged into the flow of traffic on the expressway. Emily's hand was tense on the tiller as she steered, but not because she was now late for work. That was no problem.

The problem was what she had told

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Nick. Did she have no intention of walking out on him? Was she so sure? Was Bernie just a momentary passion, born of a congruence of novelty and shock and fear and opportunity? Would he disappear as soon as the villain responsible for the chips in the Sparrow and the Mack, and for the Assassin bird, had been caught? Or was there something more between them? More than between her and Nick? And Andy. How could she fail to think of him?

The traffic was especially heavy in the three lanes bound eastward toward the city center. But the traffic on her side of the narrow strip of grass that separated the eastbound and westbound sides of the highway was quite bad enough. Every lane was a steady stream of Buggies, gas-burners, and Macks, the fastest vehicles in the leftmost lane. She had maneuvered the Tortoise into the center lane, where the speed was comfortable and she could, if necessary, pass to either side. Now she glanced at the median strip. It was concave, a drainage ditch deep enough to stop wheeled vehicles from crossing freely, by accident or design. As she passed one of the flat, paved turnarounds for official vehicles that periodically interrupted the grass, she reflected that legged genimals would not need them. They could trot as easily across the ditch as across a sidewalk. She smiled at the thought that her Bioblimps would be able to ignore even the roadway.

The smile didn't last. The Tortoise's head began to sway minutely back and forth. Normally, it held steady until she bent the tiller left or right. Then the neck and head followed her command, and the reflexes built into its nervous system by eons of natural evolution, no thanks at all to gengineers, brought the limbs and body in train. She loved to watch the process: first the movement of the head, say to the left, then the left-side limbs bent a little more, taking shorter steps, while those on the right took longer, and the beast would pivot into a shallow curve or a sharp turn, just as she, its master, its driver, wished.

But now—something was wrong. As if overcontrolled by a novice driver, the Tortoise seemed to be hunting for some proper path.

How bad could it get? Would she, she wondered, be unreasonably paranoid if she uncovered that switch Nick had used to protect them from the Sparrow? She eyed the median strip and the traffic beyond it, the trucks, fuel-driven and gengineered. If the steering went . . .

She glanced in the rear-view mirror. A gap was coming up on her left. As it reached her, the Tortoise's head stopped swaying, and the beast swung smoothly into the other lane. She had not turned the tiller.

Now the median was right beside her, and the opposing traffic and its massive trucks, heavy steel and toothy Macks, were mere yards away. Adrenaline surged through her. Her heart raced, and her mouth went dry.

She tried to steer back into the middle lane, back to the comfort of being surrounded by a horde of people going in the same direction.

The Tortoise did not respond.

She yanked at the tiller, but it made no difference. She stabbed her fingers at the "pull-in" switch's panel, expecting resistance such as Nick had met, but there was none. With a sigh of relief,

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she punched the switch. If it worked, she knew, she would suddenly become an obstacle in a steady stream of high-speed traffic. She would be hit, buffeted, rolled, bruised, perhaps more seriously injured. But she had her belt on, and she knew it would be much worse if the Tortoise crossed the median.

Nothing happened.

The panic rose still more. She punched the switch again, and again, as fruitlessly as the first time. She crested a rise and faced a mile of road gently descending and then rising into a leftward curve. She stared at the oncoming traffic, and she saw that a gap in that traffic was on its way. On the far side of that gap, a juggernaut belching smoke and noise, was a truck, all steel and engine, not flesh, not teeth, but just as deadly.

The Tortoise's nose swung just enough to align with that truck. Thereafter, it moved just enough to track it in its progress toward her.

The situation was eerily familiar. She had only seconds left, but they seemed to stretch interminably. She had all the time she needed to search the panels below the dashboard, find the one whose ventilation slits suggested the presence of electronics, open it, identify the mother board, and yank it out.

The Tortoise promptly stumbled to a halt. She gasped with relief. She had hoped only to snatch any foreign chip that might be on the board and thereby return her vehicle to normal. But now a memory rose to tickle at the back of her mind: somewhere, the source would come to her, she had read that Tortoises and some other Buggies were designed to function only as long as they received signals from their controlling computers. The computer didn't control all the genimal's functions—it ate and defecated and scratched without command—but without some signal, the beast could do nothing at all. Deprived of its computer, it was paralyzed.

Horns blared behind, and a swerving Roachster slammed the Tortoise's shell, bumping Emily's now inert vehicle onto the shoulder of the road. Another buffet slammed her into the median, tilting helplessly. There were more horns, and in the vehicles that now swept past her she could see purple faces, mouths open, fists waving.

If they only knew how little she cared for their anger! She fell back in her seat behind the useless tiller. She grinned, feeling the stretching of her face as if it were some strange and independent being, knowing that with her wide mouth she must look as foolish as . . . as foolish as she felt. She was safe. Already, her charge of adrenaline was draining from her system and her body was returning to normal.

In a few moments, she was able to lift her hand, and the Tortoise's motherboard, to her lap. She turned it over, and over again. She studied it, savoring the luxury of time. And there, a little less dusty, a little newer in appearance, was a chip that reminded her of the one Bernie had shown her. The one from the Mack.

Could she trust her memory? What if she pulled the chip and put the board back and replaced the panel and started up, and the Tortoise remained intent on killing her?

But she was a gengineer. She knew how genimals were controlled. She had

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been the one to teach Bernie all he now knew. And her memory was reliable. It had better be.

She yanked the chip from its socket. Then, hesitating only briefly, she put the motherboard back where it belonged.

The call had to be routed to his vehicle, somewhere in the city, but within moments of entering her office, Emily was telling Bernie what had happened. "I'm afraid I got my fingerprints all over it," she said. "But it worked. I plugged the board back in, and the Tortoise was fine."

She had ignored Alan Bryant when she had come in, too intent on reaching Bernie. Now he leaned against the wall, listening as he waited for her attention, his eyes wide, his mouth pursed in an "O."

"What about you?" His voice was tinny in the phone's earpiece.

"Pretty shaky. I got all the way over in the right lane as soon as I could. I stayed there, too."

"You did the right thing." He hesitated. "I should be done here before lunch. A burglary and rape. Then I'll come by and get the chip."

She wished he was there, or Nick. Either one would be a comfort, and she should call her husband soon, to tell him too, to hear his concern. For that matter, she should have called him first, but . . . To her surprise, she found herself thinking that Nick's comfort would be worth more to her than Bernie's. It would be more comforting.

She had two men in her life, as she never had had before. Someone else was trying to kill her. There were just too damned many complications. But now she had a clue to how she should resolve at least one of those complications.

She looked up as her assistant pulled himself away from the wall. What did he want? More complications?

"Gelarean's called a meeting," he said. "At ten. And we have no problems with the Bioblimps. The new babies are growing fine." When she sighed in relief, he added, "Glad you're OK."

Then, pointedly he looked at his watch. "It's very nearly ten now." ■

CONCLUDED IN NEXT ISSUE

●Our defence is not in armaments, nor in science, nor in going underground. Our defence is in law and order.

Albert Einstein
Submitted by John Hradsky

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the reference library

By Tom Easton

Tides of Light, Gregory Benford, Bantam, $17.95, 362 pp.
Who's Afraid of Beowulf? Tom Holt, St. Martin's, $15.95, 206 pp.
Look into the Sun, James Patrick Kelly, TOR, $17.95, 281 pp.
Homegoing, Frederik Pohl, Ballantine/Del Rey, $16.95, 280 pp.
Cyberbooks, Ben Bova, TOR, $17.95, 283 pp.
Hong on the Range, William F. Wu, Walker, $17.95, 247 pp.
Molecular Ramjet and Other Bedtime Stories, Larry Carlson, TadAleX (P.O. Box 78582, Seattle, WA 98178), $4.95, 212 pp.
The Best of the Nebulas, Ben Bova, ed., TOR, $14.95 pb, $19.95 hb, 608 pp.
Future Mind: Artificial Intelligence, Jerome Clayton Glenn, Acropolis Books, $19.95, 324 pp.

Meeting the authors about whose work I review here is sometimes enlightening. Last month, I panned David Drake's and Bill Dietz's *Cluster Command* because it glorified violence. At the time, I told you that I had read the book because I was about to sit on a Boskone panel with Drake and wished to be prepared.

My enlightenment came in two installments. First, when I told Drake how I was knocking the book, he shrugged and said (I paraphrase, since my memory is not eidetic and I did not take notes), "That's OK. It's just a business. And besides, I just wrote the outlines for the series." The second installment came on the panel, when I accused him of glorifying violence and pandering to adolescent bang-bang freaks. His response—and it was clearly heartfelt, serious, genuine—was to say that after emerging from America's hell in Viet Nam, the very last thing he wanted to do was to glorify violence. No, his aim was and is to show how nasty violence can be, and thus to warn people away from it.

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In the spirit of fairness, then, let me set the record straight. Drake's is a laudable and honorable aim, and in fact, as I look back at some of his past solo work, I can clearly see it in operation.

Is it a sad commentary on contemporary tastes that Drake's novels are not marketed as cautionary tales, but as Conanism? Perhaps it is. But then again, who needs those cautionary tales the most? Precisely those who love Conanism the best.

Fortunately . . . it's February as I write this, and the Ayatollah Khomeini has finally done something for which I can thank him. You see, those of us who labor as book reviewers and critics are constantly on the watch for new ways to pan books which we find bad or even disagreeable.[1] What the Ayatollah has done, in connection with Salman Rushdie and his *The Satanic Verses* (no, I haven't seen a copy), is to make it possible for us to issue "Khomeini reviews," meaning that we say, "This book is so awful that I have put a contract out on the author."

Conanists, be warned.

Likewise, every author who now figures that insulting Islam guarantees a bestseller.

Unless, of course, you're Gregory Benford, who beats the rush with **Tides of Light** and satirizes a generic religious Call-Me-God tyrant rather than any specific Daffy-tollah. The novel is the immediate sequel to *Great Sky River*, which showed us Killeen and his Family Bishop, remnants of a far-future humanity that has all but lost the competition for *lebensraum* and resources with the robotic hordes that dominate the galaxy. They use materials and equipment salvaged from dead mechs to fortify and armor their bodies, and they plug into their nervous systems chips that preserve the personalities, skills, and memories of their predecessors. Those predecessors, intriguingly, seem to have inhabited a civilization much like Iain Banks's Culture (see *The Player of Games*, reviewed in the August column). But Killeen's folk have fallen. They are scavengers, hiding, fleeing, dreaming futilely of a day when the mechs will be vanquished.

Killeen and his folk are hounded into a trap whose only exit puts them on an ancient starship. *Tides of Light* begins on that ship as it approaches a new world where insectile creatures, the podia (who amplify their bodies with mechanical parts rather more than humans and thus earn the label of "Cyborgs" from the few humans who flee before them), are dissecting the planet with a scalpel made from a small cosmic string. Killeen is captured by an unusually reflective Cyborg, released, and enlisted by the local humans, who are ruled by the above-mentioned generic Daffy-tollah, whose religious fanaticism owes much to chip-borne echoes of the long-dead past.[2] Now he must somehow extricate himself and the Bishop survivors, make a sort of peace with the Cyborgs, themselves torn apart by factionalism, and head on toward the galactic core, where the mechs conspire most ambitiously, strange beings walk (occasionally extending themselves to give him messages), and his father supposedly awaits.

What is Benford doing here? The humans and the podia are both intensely cyborged species. The mechs use biological components. There are hints that the interests and features these three groups share can be recognized, that their symbioses can rise above the level

1. It's easy to praise the good ones. A good hatchet job, however, is hard. It is also great fun.

2. Benford is a subtle fellow, he is.

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of mere parts, and that they can join and thereby more easily fulfill all their grandest dreams. In this, he will say in his next book in the series, or the next, lies the destiny of sentience.

Beowulf is the prototype hero. Grendel is the prototype monster. A great many SF&F stories owe something to the twain, and periodically a writer makes that something explicit. For an example, consider Niven, Pournelle, and Barnes and *The Legacy of Heorot*.

You might think that a second example might be Tom Holt's **Who's Afraid of Beowulf?** but you would be wrong. There's Beowulf in the title, right enough, and the story does insert a Viking hero into modern times, but the hero isn't Beowulf, and the monster is not Grendel. What we have here is a titular bow in the direction of a Nordic Pierian spring.

Happily, we also have a fun story. It opens when a survey crew breaks into a Scots barrow and calls in archeologist Hildy Frederiksen. She climbs into the tomb, finds a very well preserved longship (complete with weaponry, treasure, and a dozen Viking "corpses"), spooks, and flees. Then the "corpses" awaken. They were, you see, merely sleeping, bespelled by the wizard with them, awaiting the revival of an ancient enemy straight out of Tolkien and a new call to arms. Quickly enough, they realize that though they were awakened by accident, their enemy is most definitely alive and ascendant and in need of defeat. He is, in fact, the head of a multinational megacorporate octopus intent on exploiting personal computers to rule the world. That is, he has traded his ancient magic for modern technology. . . . Or has he? What's the difference between magic and technology? Holt says it's all in the point of view, and the traditional point of view, magic, is not only just as valid as the modern but bound as well to win out, as long as the viewer is young, noble, and true.

It's satire, of course. Holt is poking broad fun at the media, academe, business, and all the rest of modern life, using the classic technique of the stranger out of time or space to rattle our conventions. The fun gains greatly in effectiveness because Holt is a very sensible fellow—his Vikings are barbaric enough, but they are also fairly intelligent and highly pragmatic, as indeed they had to be in order to survive in their own world. As a result of sketching them so, Holt has "strangers" who can take almost anything in stride, and in the process make his readers laugh. You'll enjoy it.

James Patrick Kelly has been getting some well-deserved attention. In 1987, he gave us the novelette "The Glass Cloud," in which an architect who, when younger, had designed a high-tech building to mimic a cloud moving on a fixed course through the New Hampshire hills, has aged and found frustration in the tangles of project management while his society wife has drawn away from him for the cultism of alien "messengers," who in turn are trying to get him to take a commission on a distant planet. Now, in **Look into the Sun,** he expands that tale into the universe of his first novel, *Planet of Whispers*. He takes the alien commission, undergoes genetic reshaping to resemble the Chani, and travels to the Chani world of Aseneshesh, where he will build a tomb for an immortal goddess.

The architect is Phillip Wing. On Earth, he has been alienated by too-early success, by a wife into whose world and society he cannot fit, by pressures he cannot satisfy. On Aseneshesh, the wife

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is years behind him, but again he confronts alien world, society, and pressures. Somehow he must come to terms with the reality of a goddess, his need for other people, and his fear of accomplishment. He must, in fact, "look into the sun," a phrase that is a catchword both of the Chani religion and of the messengers' message. But despite its uses, the phrase has relevance for Wing, who must face the suns of past, present, and future, self and other, dream and reality.

And somewhere in the background lies the message of the messengers. Kelly gives us clues—references to a "seeding" in the distant past which leaves humans and Chani as cousins, mention that the message is identical with the messengers' technology, mysteries that await another book or two or three for full resolution. Watch for them. Kelly's good.

Frederik Pohl is an industrious, prolific fellow with a long history of great ideas. Think of the Kornbluth collaborations, *Man Plus,* the Heechee saga, and many more. Some are masterpieces. Some are not. All are well worth the reading, and the envy of lesser writers who can only wonder where he gets all the ideas, and the skill to develop them as well as he does even at his weakest.

Yes, I know. He draws bad reviews from time to time. But face it—even then his work usually stands head and shoulders above the yard goods that dominate the market. Thus it is that thousands greet every new Pohl book with eager anticipation, as did I when *Homegoing* showed up in the mailbox.

The story: The heavy-gravity, kangaroid Hakh'hli, a species whose society is organized very much from the top down (if the Major Seniors say a thing is *so,* it's so!) are on their way to Earth. With them, reared with a group of their own young who have been somewhat modified to give him playmates, is John William Washington, known as Sandy or Lysander for reasons never made explicit. Sandy has been told that some fifty years before, the Hakh'hli visited the Earth system long enough to note that a war was going on, pick up a spaceship with a dying man and woman aboard, remove the near-term infant Sandy from his mother's belly, and skedaddle to await a more propitious time for contact. Now that time is come, and Sandy is to be the Hakh'hli's messenger, spy, and emissary to the humans.

Sandy and his playmates land on Earth and very quickly learn that the Major Seniors have a lousy intelligence system. They are discovered much sooner than they had hoped, and soon it becomes clear to Sandy that the Hakh'hli have a hidden agenda, they have lied themselves blue, and his parentage —well, the humans tell him: there *were* no human couples in space during the war.

It's a lovely situation, but Pohl spends almost every one of his 280 pages setting it up, describing the Hakh'hli and their society and their biological technology. Then, when he has his characters in a thorough jam, he waves a magic wand, pronounces the magic word "compromise," and says, "*Voilà!* Peace forevermore!"

It isn't enough. The tale progresses very satisfyingly up to that point, but then it collapses with a thud. The resolution is far too easy to be believed.

The publishing industry is an easy target for satire. Consider: Editors can't read manuscripts in the office because their time is so thoroughly taken up with meetings. Excellent novels from first-time novelists who (of course!) have no

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track record to prove their salability are bought for minuscule advances, published in tiny quantities with no promotion, and expected to prove their worth in the marketplace, while lousy books by established authors with a record of bestsellers are bought for humongous advances, printed on the flattened corpses of entire forests, and promoted as vigorously as any presidential candidate onto the bestseller lists. Meanwhile, any editor whose books don't sell is fired, only to trade publishers with another editor whose books don't sell, and both are welcomed with open arms as shots of new blood who did wonders in their last jobs and will do them again in their new ones. Add to this such a mad resistance to change that even though the technology already exists, many publishers still cannot accept manuscripts on computer disks, much less via modem, and . . .

In other words, it's all just a little bit jabberwockish, not to mention positively brillig and slithy. And anyone who has hung around the industry for awhile, who has been editor of this and other magazines, who has worked with book publishers, who has earned renown as a writer of fiction and nonfiction, and whose wife is an agent, knows it all so well that he is eager to vent his spleen by putting it all on paper.

You've got it, folks. I'm talking about Ben Bova and his latest novel, **Cyberbooks.** He begins with computer whiz Carl Lewis, who has invented a book-sized device into which one inserts a wafer (call it a minidisk, and you're close enough) bearing the text and pictures of a book. One then reads the book, a page at a time, on screen. The reader, the cyberbook, costs, say, $200. The wafers cost pennies. The reader, the human, is thus ever after buying a handful of wafers instead of books, forests are saved, and literacy is an attainable option for the masses.[3]

Lewis has a girl friend who works for Bunker Books and arranges for him to present his ideas. After a brief delay occasioned by a competitor's sabotage, he convinces the company to bite, and then . . . The problem is that a fair portion of the industry's distribution system whiffs a hint of technological obsolescence. Bunker's sales force sues, is joined by the Canadian lumber industry, and . . .

Meanwhile, literary retirees such as Agatha Marple and Rex Wolfe are being murdered on the streets of New York. Competitor Webb Press (if you've ever spent any time on the publisher's side of the industry, you'll spot the pun) is scheming both to avoid a hostile takeover by the Sicilian Mafia and to take over Bunker. An aggrieved author is buying armament. And . . .

You name it, and Ben sends it up, punctures it, brings it crashing down, and tromps all over it. And then, just to show his versatility, he refuses to go along with one cliché, that of the publisher's offspring who, brought into the company because of kinship, displays an awesomely Wodehousian incompetence. *Ben's* Junior has the one idea that saves the day for Cyberbooks.

At a rather lower level of both humor and literary craft we find William F. Wu's **Hong on the Range.** The humor is slapstick. The plot is driven by coincidence, the characters are unmotivated so far as the reader can see (until Wu shows the cards he has hidden up his sleeve), setting and situation are inadequately justified, the technology makes no sense, and loose ends are left

3.I've been wondering where this device was for years. Now Ben tells me why I haven't seen it, and where it will show up first.

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loose. The novel is in fact a grand success in its apparent aim of being silly and making no sense.

Am I too stern? Then consider: Wu's world is a future USA still recovering from disaster, apparently biowar. People have special-purpose, add-on mechanical parts—blue eyes, accordion ankles, quick-draw hands, swivel waists, etc.—for no reasons other than fashion and authorial yuck-yucks. A few, designated by lottery as "control naturals" for some unexplained reason, are allowed neither specials nor guns and looked down upon by everyone else. One such is Louis Hong, whom we meet, trudging over the Missouri desert to meet a "steerite," a device that, given sunlight, water, and grass, grows meat; it can be slaughtered and then turned loose to grow another crop. (Why aren't our descendants sharp enough to set this up in a vat? Don't ask.) The steerite can talk, its name is Chuck (for the steak; get it?), and it and Hong become buddies. Hong then promptly falls in with bandits, gets a bounty hunter on his tail, meets a sweet Betsy from Pike, and generally stumbles over every possible western cliché. Sadly, far too many of the stumbles are quite literal.

Even the most patient and gentle of readers may be pardoned if they would rather watch reruns of *Gilligan's Island* on the boob tube.

A curious titled paperback arrived on my desk the other day from a publisher I had never heard of, TadAleX, and by an equally unknown author, Larry Carlson. A quick perusal told me that **Molecular Ramjet and Other Bedtime Stories** is a self-published book, for Tad-AleX clearly memorializes two of Carlson's kids, Tad and Alex. And besides, the puff sheet listed the publicity contact as LaDonna Brown, while the dedication named Carlson's wife as LaDonna.

So be it. Nothing wrong with that. Nor with the author's claim to be writing stories meant not only to entertain but also to educate, stories that began as, indeed, bedtime stories for Tad, Alex, and sister Rachael, stories that made kids and Mom all say, "Hey, Dad! You gotta publish these things!"

I sympathize with Carlson's aim. I do. But are the stories that good? Are they anywhere *near* that good? The answer is that any father who can make up stories like "Molecular Ramjet," in which Tad, Alex, and Rachael (here known as Jim, Bob, and Tina) invent a spaceship in the basement, get government support, and thereby enable Earth to ward off an alien invasion, has got to be one heckuva hit with his kids. "The Game," in which an older trio scores the first victory in a "war" so defined as to look a lot like a video game, doesn't hurt the image a bit. Nor does "Stranger in Town," in which an alien, injured while saving a boy from death, releases a tailored, cell-stabilizing virus that saves the ill, including a young girl with leukemia.

But if a father publishes his bedtime stories, no matter how successful they are at home, those stories must meet a different (not at all necessarily higher) set of standards. Carlson's failure here may show in his self-publication; I suspect he tried the commercial publishers and got rejected, as Milne, Tolkien, and many others did not. The reason for his rejection probably has little to do with pace, action, plot—those elements are all there, and all at quite acceptable levels—and more to do with the fairly large proportions of science education he has ladled into the stories (admittedly, and surprisingly, for an amateur writer, with

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very few great wads of exposition). More to the point may be a certain antiquated feel to the stories—they would have been much more at home in the thirties or forties, when supercompetent basement science was all the rage, when, in fact, many people were still treating SF as if it had a didactic mission. Even more to the point, at least in the title story, may be the obviously high IQs of the characters; publishers seem to prefer average-Joe protagonists on the premise that the masses of readers have trouble identifying with geniuses.

That said, you presumably know enough about the book to gauge its appeal to you and yours. So go ahead and prove the commercial publishers wrong.

If you would like a fat package of the best possible SF short stories, novelettes, and novellas written since the Science Fiction Writers of America formed and awarded its first Nebula awards in 1965, then rush to your bookstore and buy a copy of **The Best of the Nebulas.** Ben Bova put it together by surveying all members of SFWA for their opinions[4] and then putting the top-ranked stories in one volume. The result is a real gem, containing marvels of the art by Harlan Ellison, Roger Zelazny, Samuel R. Delaney, Robert Silverberg, Michael Moorcock, Joanna Russ, Fritz Leiber, Anne McCaffrey, James Tiptree, Jr., Ursula K. Le Guin, Theodore Sturgeon, Vonda N. McIntyre, John Varley, Clifford D. Simak, and George R. R. Martin. Novels are not entirely neglected but limited by space to brief discussions of *Dune, Flowers for Algernon, The Left Hand of Darkness, Ringworld, Rendezvous with Rama, The Dispossessed, The Forever War, Gateway, Timescape,* and *Ender's Game*.

A superb anthology for schools, libraries, new readers, and old fans who wish to savor the best of their memories.

Some years back, says his resumé, Jerome Clayton Glenn "was instrumental in naming the first space shuttle the 'Enterprise.' " He's also "a leading boomerang stunt man" and a futurist. In this last connection, he has written **Future Mind: Artificial Intelligence, Merging the Mystical and the Technological in the 21st Century.** The book tries to put technology in service to the mystic, to bring the mystic's values and sense of the universe as a whole to the service of the technologist. Glenn is not entirely off the New Age deep end, for he says that mysticism is valuable as a kind of art and that technology is a source of tools and freedom to make the art accessible. He thus offers a needed, unifying perspective as he catalogs the marvels waiting in the wings of life extension, body-part replacement, instant world-wide communication and computer-net access, participatory democracy, infowar, economics, education, and much, much more.

He offers little that's new to SF readers, especially those who read this magazine, other than the New Agey integration of intuition and reason. Yet he is trying to do something—bringing the New Age medievaloids into the modern age, reminding the technophiles that they have hearts as well as minds—that needs doing. Alas, Glenn's

4. And analyzing the respondents' written comments with a form of cluster analysis that makes my eyebrows go up. His statisticians looked for words and word combinations that appeared frequently in many responses and concluded that because "The most frequently used words were 'good' and 'read' " (not necessarily in juxtaposition), "The conclusion is that the SFWA members cherish a 'good read.' " I wouldn't be a bit surprised if they did, but that kind of analysis doesn't prove it.

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style is such that he seems most likely to appeal to the New Agers alone. The rationalists will find in his book support for the thought that Glenn shares the New Age tendencies to unanalyzed assumptions, credulousness, and uncritical elevation of speculation to "logical" projections for the future.

Have I offended anyone? Well then, I suppose I must admit that many of the problems I find in Glenn's book I also see in an appalling number of breezy, mass-market popularizations. At the same time, I *do* agree with Glenn that what he is trying to do is important and worth doing. In my own way, in fact, I sometimes try to do the same thing. The difference between us seems to be that where he is talking to the New Agers, in their preferred idiom, my audience is technophiles—that is, *you*.

Anadems

A final note from Boskone: While there, I met jan howard finder, who runs auctions at cons for the benefit of those SF writers (members of the Science Fiction Writers of America) who have gotten behind the eight balls of huge medical bills, house fires, and the like. (The current beneficiary is Warren Norwood.) I gave him a sack of bound galleys culled from the accumulation beneath my desk, and he asked me to mention him here.

In other words, watch for him at cons (he's the stubby, bearded fellow in the Aussie hat and the wombat T-shirt). Attend the auctions. Spend money—liberally!—knowing that it goes to a good cause. And if you have first editions or other auctionable collectibles to donate, drop him a line at P. O. Box 428, Latham, NY 12110. ■

IN TIMES TO COME

● Vincent Di Fate's December cover is for a new Stephen L. Burns novelette with the slightly unlikely title, "The Nearly Infinite Possibilities of Junk." As the title suggests, the flavor of this one is a bit lighter than some of Burns's other stories, though it's not without a serious thought or two. Junk really does have impressive potentials, as many of us who grew up on small allowances learned quite early; and a culture that produces high technology tends to produce high-class junk as a by-product. Some of what that means may surprise you slightly, it seems the materials technologists are running a bit ahead of most science fiction writers in their thinking. But Mr. Burns has been looking over their shoulders. . . .

The fact article, by Vincent D. Kohler, is a look at the *Chinese* space program (you didn't know there was one?), by someone who's been there to see it. The rest of the fiction line-up includes stories by W.R. Thompson and Amy Bechtel—plus, of course, the conclusion of Thomas A. Easton's *Sparrowhawk*.

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brass tacks

Dear Dr. Schmidt:

As a former secondary science teacher, I read your editorial in the March *Analog* with interest. I'm afraid there are many teachers just like the ones you mentioned.

I remember one of my students, who had spent much of his time getting into trouble, yet he did well in my class and even told me that, unlike other teachers, I made science fun. I really felt I was making progress with him. After I left, I talked with one of his friends who told me that things had returned to "normal" and my former student was now considering dropping out of school. Why could none of the other teachers "make science fun"?

American schools are educationally bankrupt. Many of the best teachers won't or can't work under the repressive conditions found in our public schools. And many just can't afford to teach. If I was offered a contract to teach as I saw fit—with *no* state interference—I wouldn't accept it. I couldn't afford the pay cut!

Yet more money isn't the answer. Until society realizes the importance of education, most students won't either. When a winning college basketball coach receives $150,000 a year and a physics professor at the same university is lucky to get $30,000, what message does that send to our young people?

RICHARD BUSH

Overton, NV

Dear Mr. Schmidt,

This morning while I had a few minutes, I picked up and glanced at my husband's copy of your magazine. I'm not a serious SF fan, but I occasionally enjoy reading some of the stories you have. This time I didn't make it past the editorial. I was so angry and irritated at the behavior of the teachers depicted

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in the two letters you received from students, that I decided to write to you.

Thirteen years ago I had the same experience myself, in almost the same circumstances. Taking a high school class in a subject I was interested in and enjoyed, I was accused of plagiarism twice by the same teacher. It was only after protests from myself and my parents to the school board that this teacher gave me a passing grade. A failing grade at the time would have seriously affected my chances at college entrance. Both times I was accused, the teacher's reasons were that I had written about an idea not discussed in class, and therefore it could not have been my own. To this day, remembering this incident can still enrage me.

Frankly, I think you were too lenient on these "so-called teachers." Americans need to take a *very* hard look at our public schools, and make major changes. This includes teacher competence tests, more emphasis on scholastics and less on athletics, and better pay for good teachers. As the wife of a European educated man I know very well what is lacking in my own education, and as the mother of two I realize that we will have to take the responsibility for educating them; hopefully we will be able to afford to send them to a private school. I *know* they can not get the education they need in today's American public schools. I'm sure this letter will seem extremely harsh to many people, but looking at the increase in illiteracy in America today, I don't feel it's harsh enough. I sincerely hope that these two young people who wrote to you will not be discouraged, and will continue to pursue something they enjoy doing—after all, that is the key to education. The simple fact that they enjoy reading *Analog* magazine, or even reading at all, is at least a glimmer of hope for them. I hope that someday we will see an article or story by "Anna" published. Maybe even in your magazine! Thank you for letting me blow off steam—as you can see I feel very vehemently about this subject, and hope I can do something to solve these problems. Thank you again. . . .

JANET SMITH

Buford, GA

Dear Dr. Schmidt:

Sometimes I think your editorials are full of soup. However, in the March 1989 issue of *Analog*, you hit the "nail on the thumb" on what was once my reaction to a sudden improvement in student papers. Then two things happened: 1) I began to teach in the local penitentiaries (we have eight of them nearby) and, 2) I remembered my experiences teaching swimming to children. It was a very interesting juxtaposition of thoughts.

The children were eager to learn, but some were afraid of the water. I was always amazed at how quickly they learned to swim once the fear was gone. In three days they became accomplished swimmers, and were very proud when we graded their "final" swim. Everyone looked good as the mistakes made while learning were forgotten. Pride was also the key in working with prison inmates, the "nasties" of the world. I found many to be intelligent, hard-working people who were proud of their work, and who wanted to be treated with respect. Contrary to expectations I found most cons did not cheat. The cheaters lacked pride, and you can guess who did the good work.

Putting my two sets of experiences together, I began to change. (Yes, even professors on the shady side of 50 can change). I resolved to grade the final version of papers and not the exercises that led up to the final paper. Cooper-

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ation that produces pride works rather better than confrontation. Now, when students hand in preliminary versions of their papers, I make suggestions that will allow them to improve their thinking and mode of presentation. Bless them, they like the idea so much that I got the other students in on the act, and now everybody cooperates! The result is that they work much harder, produce better papers, and do better on their examinations than they did in the past. Furthermore, they now claim to work better for professors who have not bothered to change their (wicked, old) ways.

The one drawback (?) is the large number of letters of recommendation I am now asked to write to graduate schools. And, eight student inmates have earned degrees.

DAVID E. W. HOLDEN, Ph. D.
Kingston, Ontario

Dear Dr. Schmidt:

First of all, my heartiest congratulations on your March 1989 issue, which was a winner. Every single story ranged from good to great!

As a Peruvian, I was particularly interested in "On the Wings of a Butterfly" by Michael F. Flynn. I regarded it as a very interesting treatment of our history.

However, there is one point that is flat-out wrong—a reference to the Chimu Empire of Quito. Chimu is the name of a culture on the Peruvian coast and has nothing to do with Quito.

I tend to rather doubt that a genuinely civilized being like Manco Sanchez could have belonged to a terrorist movement like Shining Path, which is in the Khmer Rouge tradition, but I admit he may have left it when he realized what it was.

One other point that could have been mentioned in the story is that Huascar was not the first legitimate heir but the second, since the first died of smallpox before the arrival of Pizarro on his third trip. If he had survived, the civil war might not have broken out.

VICTOR FERNÁNDEZ-DÁVILA
Kingston, Jamaica

P.S. By the way, an interesting historical speculation would be about the consequences of such an event in European history. It is fairly obvious, of course, that while Spain could have made a gigantic effort to topple the strengthened Inca Empire, it would have had to withdraw elsewhere to do so—probably in the Netherlands, France, and Italy—so as to be able to find the necessary army as well as financing.

Again, if the effort had not been made then it would not have been able to count on Peruvian gold and silver to finance its military enterprises in Europe, and it would have had to withdraw from the Netherlands or not intervene at all. It is likely that the Spanish Armada would not have sailed.

However, it is likely that the English and French efforts in North America would have been directed towards trade with Peru and possibly founding footholds on the Argentinian or Chilean coasts as way stations, while Spanish efforts in Mexico and North America would have been greater without the distraction of South America. One could say that you might have been publishing something like *Analog* but in Spanish. What do you think?

Dear Dr. Schmidt,

Michael F. Flynn's novelette, "On the Wings of a Butterfly" in your March issue is an outstanding work. Mr. Flynn, however, seems to have taken liberty with history in writing this story. While Pizarro and Almagro began their search for the Inca Empire in 1524, a fact

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which is accurately reflected in the story, the references these characters make to Machiavelli are slightly ahead of their time. Niccolo Machiavelli wrote *The Prince* and the *Discourses* between 1512 and 1517, but these works were not published until the 1530s. Thus, Mr. Flynn's assumption that Pizarro, Almagro, and Cortez would have been familiar with these works prior to Cortez's conquest of the Aztecs in 1519 seems unrealistic.

ALAN LEVIN

Niles, IL

Dr. Schmidt and Tom Easton:

Yes, regardless of Mr. Easton's "mind-rot," the B-29 did carry a Central Fire Control computer capable of aiming and firing a number of guns. Finding the target had to be done visually by a crew member. The human being entered in the wingspread of the attacking plane, and framed it in a circle of dots. The computer triangulated for range, and compensated for pressure, altitude, airspeed, "lead" on a moving target, and parallax between the human's position on the B-29 and the position(s) of the guns being fired. Up to the fall of 1945, when I regained the rank of civilian, it was not possible to do this by radar.

But, yes, we had airborne radar as early as 1942, borrowed from the British who originally developed it. I flew on anti-submarine missions off the East Coast of the USA and later from bases in England and North Africa. Our radar was fairly crude by today's standards, but it could find a surface vessel or surfaced submarine in the ocean, and could make out the shape of a shoreline. For security reasons, none of this reached public print.

By 1945, work was being done on bombing by radar from the B-29, but I don't know if this ever became workable before V-J Day. Under favorable conditions, the radar I knew by 1945 could make out the clutter of a city as distinguished from countryside, but the actual bombing had to be done visually.

Does this help cure the "mind-rot"?

ROBERT E. KILBRIDE

Chicago, IL

Dear Mr. Easton:

Maybe you are correct—maybe it is brain rot, but if so, it is partial and reversible. There are probably lots of us still left who remember the B-29 Stratofortress, but I would like to get in my comments, for what they are worth.

I never worked directly with the B-29, but I knew of it, observed its operations, and visited it on Okinawa. The original B-29 did indeed have a (mostly) central fire-control system and airborne radar. The radar, however, was part of the ground target acquisition and bombing system, not part of the air-to-air fire control.

To take last things first, the B-29 had only one set of guns directly controlled by the gunner you have seen in old movies. He sat in the extreme tail and was responsible for the operation of the tail guns. I do not know whether they were power-operated, but they had a very limited arc of fire.

The central fire-control system inhabited a large steel cylinder, some three feet in diameter, that sat on the floor at the rear of the flight deck and extended out of sight into the overhead. This was reputed to be extremely heavy and I never knew just what it contained. There were two top sighting stations, small clear blisters, one just aft of the flight deck and one aft of the bomb bays that fed information electrically into this control. This information was derived from "gunners" who tracked incoming

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aircraft with simple sighting devices mounted on universal bearings. There were two more sighting stations aft of the wing, located on the sides at waist level and similarly equipped with sighting devices feeding into the central. There were two top turrets and two bottom turrets, opaque in appearance, that bore power-trained and operated guns, taking their direction from the central control.

I feel quite sure that the operation of the central system would be neither digital nor readily recognizable as a computer. This system was, however, believed to be able to track incoming fighters, derive the proper deflection from the observed speed and angle, and lay the guns most accurately. My impression is that selsyns were widely used as coupling devices but I cannot be sure. I do not know how the command to fire was transmitted.

When General LeMay made his famous decision to abandon the very high altitude precision bombing theory and to bring the 29s down on the deck, the turrets and central fire control were removed to save weight, the openings being blanked over. Tail-end Charley, way out there in the back with his two guns, was retained, and the tremendous tonnage which the modified 29s could carry spelled military doom to Japan.

WILLIS H. BLEDSOE
Colonel (ret) US Air Force
Underwood, WA

Dear Dr. Schmidt,

Your editorial in the April 1989 issue was very much to the point: under the current regime, *Analog* magazine does not have a "party line."

However, readers who think it does may be excused for thinking so, when *Analog*'s own book reviewer evidently thinks so. Consider his column in the same issue: "Science fiction readers all know the world is going to hell in a handbasket. . . . You've read about [it], in fact articles and stories in this magazine . . . " As a lot of the material in *Analog* is of the optimistic persuasion, we must conclude either: (a) Tom Easton doesn't actually read *Analog*, or: (b) Tom Easton does his best to forget anything that contradicts his beliefs as soon as he reads it.

Easton goes on, "There is a Dark Age coming from which the human species may never again emerge. There are plenty of SF stories that ignore or duck the truth." From which we may conclude, while *Analog* does not have a "party line," *Analog*'s review column does!

I find this disturbing for two reasons. First, Tom Easton has a monopoly on book reviews in *Analog*. Second, bias in a reviewer can be very hard to detect and allow for, which makes it particularly insidious. A reviewer may condemn one book for flaws he excuses in another, when (unknown to the reader) the real issue is that one book says something the reviewer doesn't like, while the other agrees with his views. Or he may simply drop books down the memory hole: not review books that contradict his views, no matter how good they are.

The only safeguard against this kind of hidden bias is: end the monopoly. Rotate reviewers, whose biases will cancel each other out.

TARAS WOLANSKY
Kerhonkson, NY

Actually, there's a hidden danger in your proposal. The biases would not *cancel out, because all reviewers would not be covering the same books. Each book would be covered from only one reviewer's viewpoint, with his biases, and you would have no basis for com-*

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parison to recognize those biases. When one reviewer always appears in the same places, you can learn what his biases are and how they compare with yours. One of the most useful *reviewers I've ever found was one who was* always *wrong (by my lights) about movies!* ■

FUTURES

(Continued from page 83)

the character that dies first. But DeepStar Six doesn't sacrifice him quickly at all. To genre aficionados, this immediately causes raised eyebrows and concern. What's going on here?

The reason for preserving his existence soon becomes clear. He's needed to perform a series of faux pas that actually propel the film to its climactic conclusion. First, and not least, he accidentally detonates one of the nuclear warheads. Oops. Then, when this dwindling party is fighting the creature, he accidentally injects a CO_2 cartridge into one of the scientists' backs, causing him to rather messily explode.

While SF films have, in general, abandoned any attempt at the social commentary or the subtext that made a few fifties films dearly loved classics, there is a recent film, just released on video, that recalls that era. John Carpenter's *They Live!* (MCA Home Video) would have been very much at home in the Eisenhower years.

In *They Live!* aliens have inveigled themselves into corporate America, wearing ties and disguising themselves to look like humans. The aliens have taken over the media, from TV and magazines, to the lowly billboard, planting subconscious messages to conform and serve the system.

While real humans tumble down the economic food chain, the aliens acquire the good life, circa 1990. But the hero well played by wrestler Roddy Piper, stumbles upon a secret group of humans that have developed glasses that let you see them for what they really are—skeletal creatures with bulbous eyes and exposed muscle tissue. The glasses also let Piper see the hidden messages. Conform. Obey. Consume.

OK. Maybe it's not the most subtle idea in a film, with its Republicans-as-aliens theme. But hell, at least it's an idea. There's some attempt at social commentary, to use the medium for something other than special effects and visceral thrills. And the film remains intriguing until Carpenter gets side tracked into a painfully overlong martial arts battle which stops the action. ■

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a calendar of analog upcoming events

27-29 October
WORLD FANTASY CONVENTION at Sheraton Hotel and Towers, Seattle, Wash. Guests of Honor—Ursula K. Le Guin, Somtow Sucharitkul, Robert McCammon, TM—Ginjer Buchanan. Registration—$70 attending, $30 supporting until 1 May. Attendance is limited. Info: World Fantasy Con '89, Box 31815, Seattle WA 98103-1815.

3-5 November
WINDYCON XVI (Chicago-area SF conference) at Hyatt Regency Woodfield, Schaumburg, Ill. Guest of Honor—Barry B. Longyear, Editor Guest of Honor—Beth Fleisher, Artist Guest of Honor—David Lee Anderson, Fan Guest of Honor—Mike Glyer, TM—Wilson Q. [sic] Tucker, Special Guests—George Alec Effinger, Lawrence Watt-Evans. Registration—$20 until 30 September, $25 at the door. Info: Windycon XVI, Box 432, Chicago IL 60690.

17-19 November
PHILCON '89 (Philadelphia-area SF conference, the 53rd!!) at The Adam's Mark Hotel, Philadelphia, Penna. Principal Speaker—Philip José Farmer, Guest Artist—Don Maitz, Special Guest—Poul Anderson. Registration—$17 until 15 September, $20 until 1 November, $25 at the door. Info: Philcon, Box 8303, Philadelphia PA 19101. (215)342-1672.

17-19 November
SOONERCON 5 (Oklahoma SF conference) at Central Plaza Hotel, Oklahoma City, Okla. Guest of Honor—Walter Jon Williams, Artist Guest of Honor—Brad W. Foster, Fan Guest of Honor—Roger Allen, Filk Guest of Honor—Randy Farran, TM—Brian Thomsen, Special Guest—David Brin. Registration—$10 in advance, at least $15 at the door. Info: Soonercon 5, Box 1701, Bethany OK 73008. Include S.A.S.E.

24-26 November
DALLAS FANTASY FAIR (media-oriented convention) at Marriott Park Central, Dallas, Tex. Registration—$15 in advance, $20 at the door; attendance estimated at 2200. Info: Bulldog Productions, Box 820488, Dallas TX 75382. (214)349-3367.

30 November-3 December
POLCON '89 (Polish national SF convention) at Gdansk, Poland. Guests of Honour—Brian Aldiss and Kir Bulytschov, Artist Guests of Honour—Michelangelo Miani and Theodore Rotrekl, Fan Guest of Honour—Charles N. Brown. Registration—US$84 attending (includes registration, room and board plus siteseeing in Gdansk), US$15 supporting. Info: Gdanski Klub Fantastyki, ul. Chylonska 191, 81-007 Gdynia, Poland. Include sufficient International Reply Coupons for airmail reply.

23-27 August 1990
CONFICTION (48th World Science Fiction Convention) at Netherlands Congress Centre, The Hague, Netherlands. Guests of Honor—Joe Haldeman, Wolfgang Jeschke, Harry Harrison; Fan Guest of Honor—Andy Porter. *Registration—$65 until 31 December* 1989. Supporting—$28 until 31 December 1989. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: Worldcon 1990, Box 95370, 2509 CJ The Hague, Netherlands. Enclose sufficient International Reply Coupons for airmail response.

—Anthony Lewis

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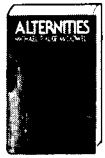

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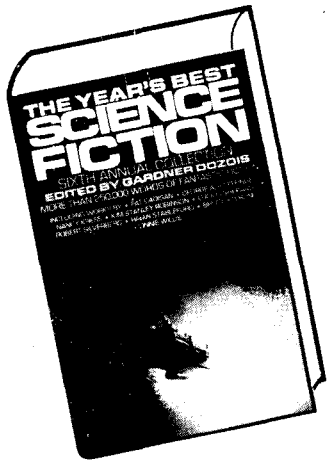

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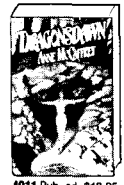

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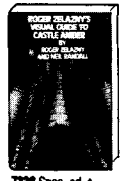

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